The Chemical Age

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Chemical Plant Standards

GREAT strides have been made in the standardisation movement since our last annual Chemical Plant and Engineering Number, and no attempt to review the general development of plant would be complete without reference to the work that has been steadily proceeding towards the setting up of clearly defined standards and the formulation of recognised specifications. Within recent months, the scope of the old British Engineering Standards Association has been widened, and the new British Standards Institution embraces a comprehensive field in which provision is made for every important branch of engineering activity. Outstanding among its new activities has been the establishment of the Chemical Division, which aims at the standardisation not only of chemical materials but of the plant and engineering requirements of chemical industry. Sufficient has already appeared in the columns of THE CHEMICAL AGE to show that the motive underlying standardisation practice is not the mere introduction of rules and formulae, but the modelling of sound general principles which will make for the increased efficiency of industry.

This tendency affords evidence of the recognition of the need for co-operation and co-ordination in one of the most vital industries of the nation, and demonstrates that the makers of plant as well as the chemical manufacturers are willing and anxious to avail themselves of every opportunity for improvement. As the President of the Board of Trade said last week, the standards movement is of more than national importance. He was speaking at the joint meeting of the British Standards' Institution and the Standards Association of Australia, on which occasion Mr. C. le Maistre, Director of the British organisation, whose remarks were transmitted from Sydney to London by wireless, spoke from personal experience of the immense value of the standards movement in both hemispheres. Inter-imperial co-operation tends to confer ever-increasing benefits upon the countries concerned, and we commend the participation of the chemical industry in the movement as one of the most hopeful signs for the future.

Employers and Education

THERE is so much food for thought in the Report on "The Teaching of Applied Chemistry," lately issued by the Board of Education, to which brief reference was made in these columns last week, that no apology is needed for returning to the subject. The Report will be of great assistance to local education authorities, governing bodies, teachers and others interested in the provision of instruction in this important subject. A highly satisfactory feature of the Report is its reference to relations with employers. The practice has developed considerably in recent years of employers encouraging and stimulating the attendance of their employees at classes, paying their fees, receiving reports, making promotions, awarding prizes and aiding the classes by money grants or gifts of equipment. Assistance is now being given by societies, associations or groups of employers, and this relatively new phase is accompanied by a closer interest in the instruction provided for particular grades of employees. The net result is that technical training is ceasing to be an extraneous provision of which industry availed itself without much inquiry or consideration, and is tending to become a definite element of industrial organisation. The tendency strengthens the view that economy and efficiency can be secured by organisation for industrial, rather than local government areas.

It has sometimes happened that local government boundaries have presented difficulties. There have been differential fees which have imposed disabilities upon students who have desired to attend classes in a neighbouring area, but these obstacles are becoming fewer. The extension of the instruction, and of co-ordination, illustrates the readiness of education authorities and the governing bodies of schools to co-operate with industry, and to meet as far as they can its ever-widening and ever-changing needs.

A New Technique Required

A DEVELOPMENT now in progress involves recognition of the fact that within each industry there are men with different functions and that the same kind of training is not suitable for all. The instruction required by men engaged on plant or process may involve very little knowledge of chemistry. What is going on inside the retort, or autoclave or vat is a matter for the chemist, and not, in the same sense, for the men employed. But they are often controlling apparatus and machinery the understanding of which requires a knowledge of elementary physics and mechanics, and at present there is little or no opportunity for them to obtain instruction of a suitable character. The existing classes in physics, chemistry and mechanics are not suitable. They are intended for students of different previous education, different everyday experience and different aims. The content of the syllabus must take into account both the man and his function in the industry. The traditional method of approach is not likely to be successful, and a new technique of teaching is required.

Reference is made in the report to the desirability of providing more advanced or highly specialised instruction in a larger number of centres, and it is suggested that in the case of foods and drugs, fermentation and similar subjects the larger institutions should offer instruction in these subjects in rotation. Students would thus accumulate, and no very long period would elapse without instruction being available. A similar plan might be adopted in the case of chemical engineering. This subject might be of considerable value in districts where heavy chemicals are manufactured. It would deal with the general principles underlying the design and operation of plant without involving detailed knowledge of a process.

The Sulphate of Ammonia Position

DURING the past year the economic position of agriculture has deteriorated still further, and the decreased purchasing power of farmers is reflected in a decline in the consumption of fertilisers. The eleventh annual report of the British Sulphate of Ammonia Federation for the twelve months ended June, 1931, shows that the fall, with few exceptions, affected every form of nitrogen, whether for fertilisers or for industrial use, in every continent. The biggest reductions in tonnage consumed were in America, Germany, Holland, France and Poland, and the largest percentage decline in Cuba. The greatest increase in tonnage was in Russia, and as a percentage in Portugal. Whereas the world consumption of Chile nitrate declined by 33 per cent., the demand for by-product and synthetic nitrogen fell off by only $13\frac{1}{4}$ per cent. Strenuous efforts were made throughout the twelve months to find a permanent basis for co-operation amongst the nitrogen producers of the world, but it proved impossible to reconcile the claims to shares in the trade put forward by the various groups, notwithstanding the heavy sacrifices which the British and German synthetic groups declared their readiness to make. Since July, therefore, the nitrogen market has been the playground of unrestricted competition. Most European countries which are both producers and consumers have adopted protection in one form or another and maintained a level of prices slightly lower than that of the previous season. In the free markets a fall in price of the order of 50 per cent. has taken place. In normal circumstances such a fall would have greatly stimulated sales, but in the present world-wide crisis no very marked effect can be hoped for.

Home Consumption

HOME consumption of sulphate of ammonia showed a decline on the 1929-1930 figures of 21,740 tons, or 11.85 per cent. The total consumption of pure nitrogen in the United Kingdom for all purposes amounted to about 60,760 metric tons, against 67,924 tons in the previous year. The tonnage used in industry is estimated at 17,400 tons, against 20,400 tons in the previous year. Total exports from Great Britain and Ireland show a decrease of 177,938 tons, or about 28 per cent., on the previous year's figures, but during the year there was a reduction in the stocks on hand.

Fertiliser propaganda had to continue to fight the unremunerative prices obtainable for nearly all agricultural products. It was increasingly difficult to achieve sales under such conditions, which reduced not only the economic benefit of fertilisers to the farmers but also the general purchasing power. The question of the cost of propaganda caused some misgiving, but it was decided to continue all existing efforts, and in some directions and in certain countries to extend them, although this entailed expenditure in excess of the allowance granted by the Federation. This decision, however, was fully justified not only by the results of the 1930-1931 season but by the progress that has been made in the 1931-1932 season.

The Calendar

Feb. 1.—Institute of Fuel. Presentation of Melchett Medal. Melchett Lecture on "A Century of Fuel Economy," by Professor W. A. Bone. 6.30 p.m. Institution of Electrical Engineers, London. Followed by Dinner at Connaught Rooms.

Feb. 1.—Society of Chemical Industry (London Section). "Economics and Chemical Manufactures." H. A. F. Lindsay. 8 p.m. Burlington House, London.

Feb. 2.—Hull Chemical and Engineering Society. "Construction of Boilers." J. Thompson. 7.45 p.m. Grey Street, Park Street, Hull.

Feb. 3.—Society of Public Analysts. 8 p.m. Burlington House, London.

Feb. 4.—Society of Chemical Industry (Bristol Section). Joint Meeting with Institute of Fuel. "Smoke Abatement." V. R. Chadwick. 7.30 p.m. University, Bristol.

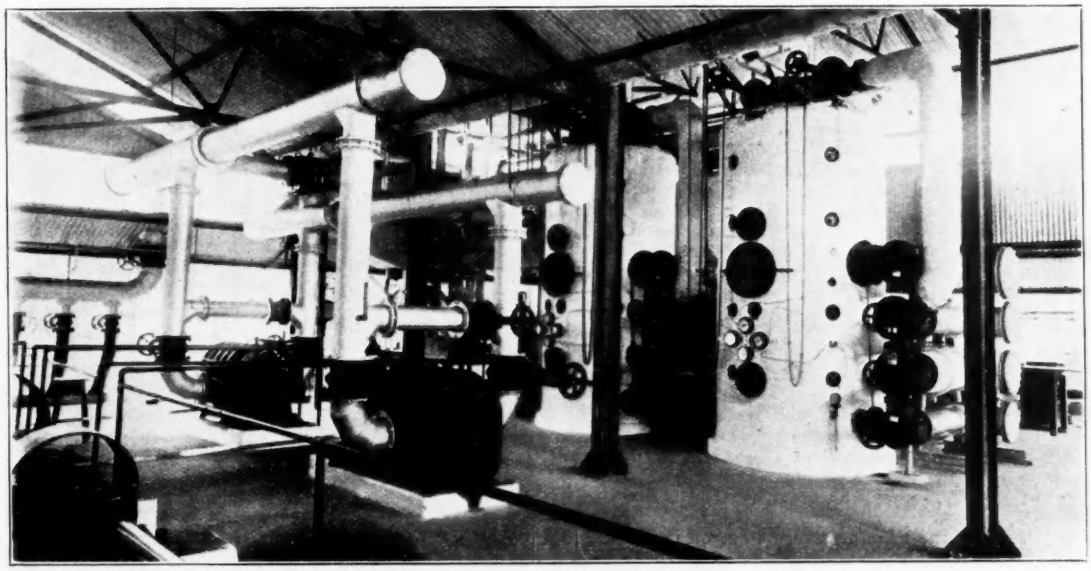
Feb. 4.—Chemical Society. 8 p.m. Burlington House, London.

Feb. 4.—Institute of Metals (Birmingham Section). "The Dilatometer in the Study of Steels." N. P. Allen. 7 p.m. Chamber of Commerce, New Street, Birmingham.

Feb. 5.—Society of Chemical Industry (Manchester Section). "The X-Ray Examination of Sub-crystalline Materials." F. D. Miles. 7 p.m. 17 Albert Square, Manchester.

Feb. 5.—Institute of Fuel. "Industrial Furnace Design." E. W. Plumley. 7 p.m. Technical College, Green Lane, Derby.

Feb. 6.—Midland Chemists' Committee. Annual Dinner Dance organised by the Joint Committee of the Society of Chemical Industry, the Institute of Chemistry, and British Association of Chemists. Midland Hotel, Birmingham.



A British Carbo-Union Installation Recovering Gasoline at Trinidad.

Modern Solvent Recovery Technique

By J. C. Liddle

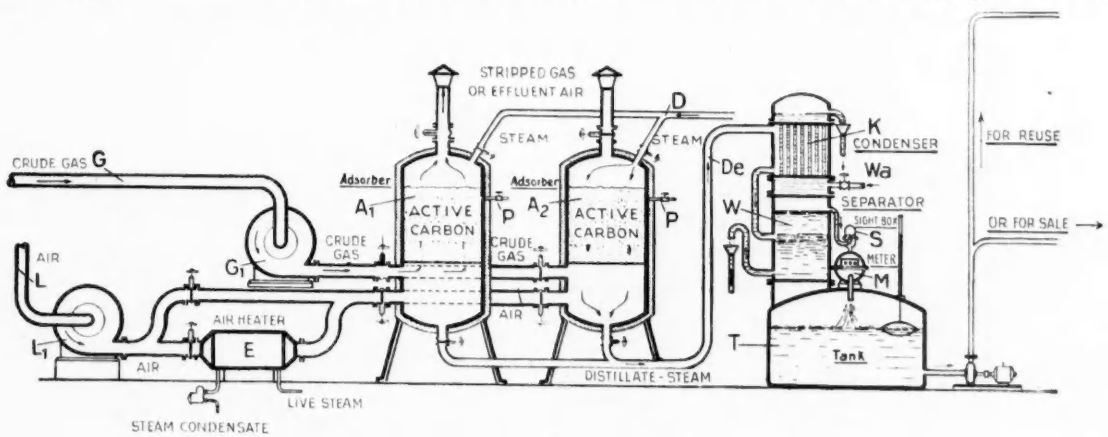
This article deals with solvent recovery by the Carbo-Union (Bayer) Active Carbon Process which is now in operation in many solvent using industries. The author is general manager of British Carbo-Union, Ltd., London.

Great changes have been made in almost every branch of chemical industry in the past twelve years by the introduction of new and improved solvents, and by the development of new processes, which have reduced manufacturing costs, and resulted in superior products. In most cases the solvent is merely an agent to facilitate manufacture and it is unusual for the solvent to be even partially retained in the finally manufactured article. It is not surprising, therefore, that many efforts have been made to recover these solvents, which formerly were wholly or partly lost, thus constituting a heavy charge on the industry.

Before Bayer discovered and applied the active carbon process, many different methods of recovering solvents were tried out, such as condensation, compression and cooling, and absorption by liquid media. The results from these efforts were, on the whole, very dissappointing. It is not surprising, therefore, that when the advantages offered by the British Carbo-Union solvent recovery process were broadcast, many manufacturers were very sceptical. Plants, however, were installed in various industries, such as rubber proofing, artificial silk, gas works, oil wells, dry cleaning, leathercloth, ammunition factories and lacquering works, etc. The results obtained were so consistently successful, that a large number of plants have now been installed, and the original prejudice experienced has completely disappeared.

The Adsorption Process

The plant used consists essentially of a number of adsorbers, each containing an active carbon bed, the necessary exhausters, condensers, separating tanks, etc. The number and diameter of the vessels is determined by the quantity of solvent air or gas mixture, and its solvent concentration, to be treated per hour. In a two adsorber unit plant, the solvent laden air is passed through the first adsorber, and the active carbon retains the solvent practically quantitatively. The lower layers of carbon first become charged and the adsorption zone creeps up the carbon bed, until about to break through. This vessel is then switched out and the second vessel is switched on to the rich gas stream Steam is next introduced at the top of the first adsorber. This drives out the solvent, which passes into the condenser. The condensate either separates out and is ready for immediate re-use, or, if soluble in water, an aqueous solution of about 30 per cent. strength



Schematic Arrangement of the Carbo-Union (Bayer) Active Carbon Process.

is formed, which must be rectified in the usual way. The carbon in the first adsorber is now dried by passing warm air through it, and it is then cooled by cold air, thus completing the cycle. The solvent recovered is equal in quality to the original solvent.

Unlike silica gel, active carbon has a selective action for organic solvents in preference to water. Even if rich gas was passed into moist carbon, the solvent would be extracted, but the adsorption zone would become much higher, and a breakthrough would occur earlier. To maintain the same efficiency, this would mean that steaming out would have to take place at very much shorter periods. To maintain maximum efficiency and economy therefore, the drying and cooling period is very necessary.

Difficulties Overcome

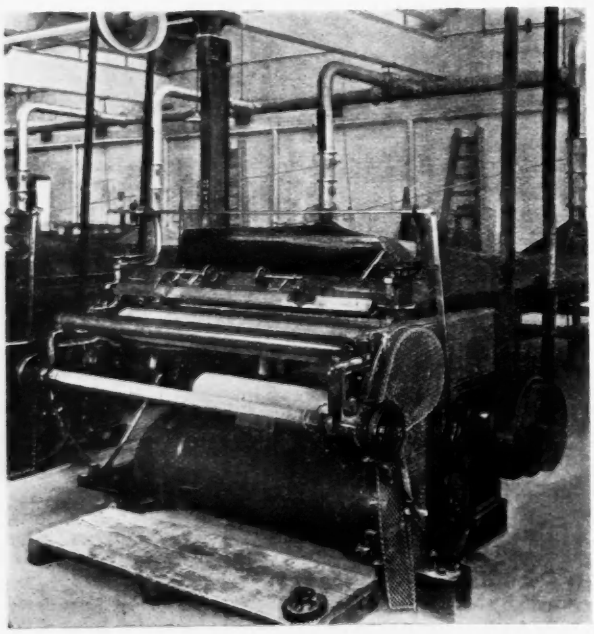
In the development of this process many unexpected difficulties arose, but these have now been completely overcome as a result of practical experience, and a number of special features are now incorporated in British Carbo-Union designs. The recovery plant must be so designed as to work at a temperature far below the oxidation limits of the solvent. The carbon itself must be capable of taking the highest charge possible, in proportion to its own weight. It must not be too retentive and should hold a low rest charge. The grains should be shaped so as to offer a minimum of resistance to the gas passing through.

Hoodings, too, must be efficient without restricting production, for in most manufacturing processes, the products under manufacture must be accessible, and hoodings must have large working openings. If insufficient suction is applied, the solvent vapours will escape out of the hooding, and so will be lost for recovery. Dangerous pockets of highly concentrated gas would also form in odd corners inside the hooding. Strong suction, however, overcomes these difficulties and also sweeps away the highly charged atmosphere from the points of evaporation, and this assists the drying. In some cases where the machines could not be satisfactorily hooded, these have been placed in rooms from the base of which the solvent laden air is drawn off, while fresh air is admitted from above, and a further saving of solvent is so obtained.

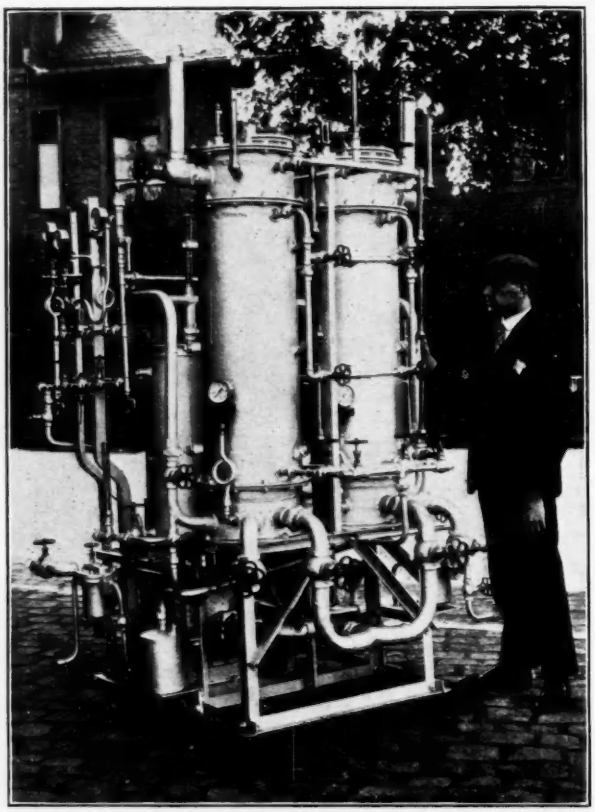
In cases where this solvent recovery is applied, a marked improvement in hygienic conditions is at once apparent, and fire risks are reduced to a minimum. These conditions can only be obtained when the solvent recovery process is capable of dealing with low concentrations. When the hooding is carried out as briefly described above, the concentration of solvent in the air rarely exceeds 20 grams per cubic metre. This is well below the lower explosive and combustion limits of solvents normally used in modern factories, as shown by the following table:—

Solvent.	Concentration in Air.
Acetone	73 gms cbm.
Alcohol	52 ,,
Benzol or benzine	48 ,,
Carbon disulphide	31 ,,
Ether	52 ,,

In spite of this the whole suction system is very adequately protected by safety devices, flash traps, etc., as a precautionary measure.



HOODING AS FITTED TO RUBBER SPREADING MACHINES.



A SMALL BRITISH CARBO-UNION PLANT RECOVERING 8 LB. OF SOLVENT PER HOUR.

Percentage Recovery Effected

The average efficiency results, obtained by direct measurement, not including factory losses and suction leakages, exceed 98 per cent., and overall factory recoveries of about 80 per cent. are frequently reported. Measurements of the solvent in the air leaving the recovery plant vary between 0.05 and 0.15 grams per cubic metre. With a concentration of 15 grams per cubic metre in the incoming air, the loss during the adsorption period is, therefore, only 1 per cent. or less. The operating costs of these plants, including steam, water, power carbon consumption, maintenance and labour at to-day's prices, total less than 2d. per gallon of solvent recovered. The carbon consumption is negligible, as over 10,000 cycles have been obtained with one filling of carbon in several Carbo-Union plants. Originally it was thought that a continuous process would be an advantage, but as the plant had to be designed to meet peak loads it was found that intermittent working was more economical. In most factories there is a considerable fluctuation in the load, which can be dealt with by extending or shortening the adsorption period, so that steaming out occurs only when the carbon is fully charged. Operated in this manner British Carbo-Union plants usually pay for the initial outlay in a very short time.

Heat Losses in Chemical Works

By W. A. Mitchell

These notes indicate some of the means which may be adopted to prevent heat losses. In many chemical works there is still a certain disregard for the monetary value of heat, although rigid economy is exercised in other directions.

UNDER modern conditions of keen competition it is fully appreciated that production costs in a chemical works should be as low as possible. It frequently occurs, however, that a process is economically efficient regarding the yields obtained and in the working up of the by-products, but too little attention is paid to heat losses. For example, it is a common sight in some of the smaller works to see a steam driven pump exhausting to the atmosphere with the resulting loss of valuable hot boiler feed water which could be recovered by the use of a simple air condenser.

Boiler Plant and Steam Pipes

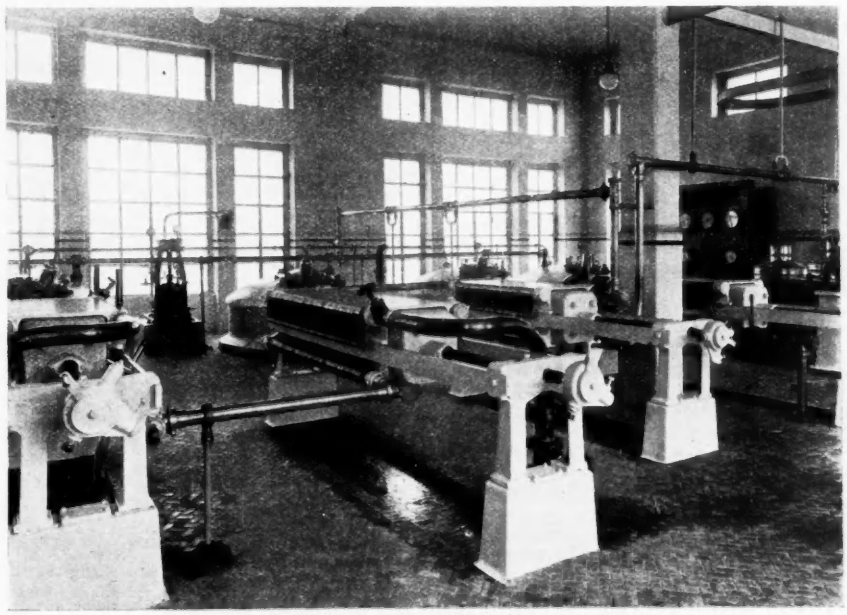
In a systematic investigation of the steam losses in a plant, consideration should first be given to the boiler. The boiler should be kept in efficient working order, boiler trials should be carried out occasionally and heat balances prepared in order to keep a check on its efficiency. In connection with the question of steam production, the ideal system is to generate high pressure steam, expand it through a prime mover and use the exhaust for heating purposes. Unfortunately, in the majority of chemical works, except some of the largest, the steam requirements for heating purposes considerably exceed the power steam requirements. However, the possibilities of the application of this principle should always be borne in mind.

Radiation losses from pipe lines, steam-jacketed equipment, etc., should be reduced to an economic minimum. The thickness of lagging used for this purpose depends on the relative costs of the lagging and steam, but it is not generally known that, under certain conditions where a small diameter steam pipe and poor insulating materials are used, radiation losses from the pipe are increased by the application of such a lagging.

Evaporating Pans

It is all too frequent an occurrence to see open evaporating pans and stills unlagged. One is frequently tempted to suggest that many pharmaceutical manufacturers should pay more attention to the lagging of their pans and stills than to polishing them. It should be remembered that lagging can be made to possess quite a presentable appearance. The advantages of lagging are obvious.

The next point to consider is the question of heat losses in the process itself. In an evaporating process the possibility of the application of the multiple effect principle should receive consideration. In all cases there is an optimum number of effects which varies with the ratio of the charges on the plant to the value of steam. This principle may be applied to cases where more than one material is being separately evaporated, the vapours from one evaporator being used as the heating medium for the second evaporator. If both are working on aqueous liquors and the first one is working at atmospheric pressure it will be necessary to arrange for the second evaporator to work under reduced pressure in order to obtain temperature difference between the material to be evaporated and the heating steam. On the other hand if the second evaporator is working on organic liquors possessing lower boiling points than water it may be unnecessary to work this evaporator under reduced pressure.



THE A.P.V. PATENT TYPE HEAT EXCHANGER.

The use of heat exchangers for recovering heat in processes and from waste liquors is an obvious means of reducing steam consumption. The number of cases where such machines are not used and where the savings effected by their use would pay for the machines in a comparatively short period is surprising. A type of heat exchanging machine which is finding increasing application in the chemical industry is here illustrated. This unit is a plate machine, possessing many advantages over the more usual tubular construction.

In a certain works, which the writer recently visited, heat exchangers were installed for the purpose of recovering heat from waste aqueous liquors for boiler feed purposes. The liquors consisted mainly of one at 185° F. and another at 75° F. These were being discharged in roughly equal quantities, mixed together and passed through a heat exchanging installation consisting of four separate units. With this arrangement it is obvious that the maximum temperature to which the boiler feed water could be pre-heated would be 130° F., whereas if the waste liquors had not been mixed and separately passed through the units of the heat exchanging installation in counter-current to the boiler feed water, the latter could have been pre-heated to a temperature within a few degrees of 185° F., with consequent enhanced economy.

Modern Rustless Steels

By A. C. Rowe

When it is remembered that but a few years have passed since the first malleable corrosion-resisting steels were put on the market (1926), it has to be admitted that steel metallurgists have made enormous progress. Not only are there at least four main varieties of rust and corrosion resisting steels (or perhaps irons would be the more accurate term), but there have been developments in application and in the form in which they can be procured.

ANALYSES are not a guide towards the quality of stainless steels. One has to consider rather the quality of iron employed. The character and source of the other ingredients, the methods of manufacture adopted in the producing works, and other important points that no analysis fully reveals. In the four main types of malleable stainless steel, the base analysis is identical, but differing needs necessitate a slight variation here and there.

Stainless Steel Tubes

The second important variety is one from which copper has been excluded. The reason for this is that certain operations in the manufacture of tubes from this steel are facilitated thereby. If the chemical engineer needs stainless steel in tube form, he should clearly indicate that he desires a quality not containing copper. Price will not be affected, but delivery may.

The third type is one in which roughly one half to one per cent. of tungsten is added, the copper content being reduced by one half per cent. This is owing to the necessity that frequently arises of welding certain parts of plant, whether by the electric arc or the oxy-acetelene process. Usually, it is advisable to normalise a part or piece of stainless steel after it has been welded, this operation being carried out at 1,150/1,200° C. If this can be done, it is better to use the standard (No. 1) quality. But when the part is too large or unsuitable, owing to some factor in its design, for this normalising process to be carried out, the variation in analysis mentioned above must be made. The reason is that in welding the steel, the place of deposition of the metal is itself actually melted. The heat from this melted portion is led along the plate or bar at each side of the weld. In consequence, there is a zone of roughly ½ in. to ¾ in. on each side of the weld that has been subjected to a temperature of 600/900° C., constituting a "critical range," and greatly lessening the steel's resistance to corrosion. Tungsten, added as indicated, greatly lessens the harmful effects of this critical range. It should be borne in mind that the tungsten quality is only to be used when normalising is impracticable.

The fourth variety contains molybdenum in percentages varying between 3 and 4 per cent. This type is of great value to the chemical engineer, because it resists sulphuric acid better than any other ferrous metal. It must be remembered that no ferrous material has yet been discovered that will withstand sulphuric acid entirely, but the molybdenum variety of stainless steel resists it very well, and certainly better than any other steel.

Recent Developments

Before passing on to an indication of the type of chemical plant for which these steels are now being used, one may refer to certain interesting modern developments. First, one may mention the free-cutting stainless steel, which combines the free-cutting properties of a Bessemer steel with the resistance to corrosion and heat of a good quality stainless steel. It is specially suitable for parts needing to be drilled, turned, bored, threaded, ground and polished. The typical analysis of this steel is C. 0.05 to 0.12 per cent.; Mn. 0.25 to 0.5 per cent.; Si. 0.50 max.; Cr. 12½-15 per cent.

Another development is of American origin. Steel sheets are now being sold which have been veneered on one or both sides with 20 per cent. rust-resisting metal, in thicknesses of 0.015 in. and heavier, and coils or straight lengths have been dealt with in the same manner. Then there is a chrome nickel steel wire rope intended to resist the attack of salt water or salt air, and also to operate at temperatures up to 900° C.

To deal with hydrochloric acid, an iron containing nickel and molybdenum has been developed. It can be forged, rolled into sheets, made into castings, etc., and is readily weldable by the electric arc or oxy-acytelene processes. It offers, in addition, effective resistance to acetic, formic and similar acids, and has been found quite good for sulphuric acid. For purposes requiring a fairly stainless steel at a lower price than is usually charged for the better-known metals, a five per cent. chrome steel has been experimented with, particularly for hydraulic constructional work, as rods for reinforcing concrete), and as tubes and fittings for apparatus subjected to corrosion by liquids and gases. Makers of oil tanks and coal wagons, where sulphur products have a corrosive action, are also considering its employment.

Some Standard Chemical Cases

The standard chemical uses of stainless steels include bolts, chimneys, boiling pans, *e.g.*, steam-jacketed pans, pump rods and impellers, hydro extractors, nitric acid plant, trays, wire gauze, shafts, tubes, valve plates for compressor work, pipe unions, tanks, elevator chains and buckets, coagulation pans, dairy machinery, deodoriser parts, drums, dyework, filters and many other parts and purposes. A point to be borne in mind is that not only do these steels offer an excellent resistance to most corrosive agencies, but they also resist heat and the oxidation caused by heat in a remarkable measure. (One refers here not to the heat-resisting steels as such, specially designed to withstand temperatures as high as 1,200° C., though these are also stainless, but to the stainless malleable steels previously described.) On the average, at temperatures up to 1,000° C., these steels give quite a fair tonnage figure (certainly far better than can be obtained from ordinary carbon steel), with excellent resistance to scaling.

Modern stainless steels can be obtained in the form of billets, ingots, bars, plates, sheets, forgings, castings, stampings and angles. They can be welded, rolled, cold-worked, hot-forged, riveted, soldered, brazed and caulked. They are not difficult to machine, so long as the edge of the tool is maintained. An average coefficient of expansion for a typical standard malleable stainless steel is 0.0000178 mean coefficient of expansion per ° C., for a temperature range of 0° C. to 450° C., as compared with 0.0000128 for a mild steel over the same range. The weight of the material is 128.4 grams or 0.2826 lb. per cubic inch. The specific gravity is 7.923. In the as-rolled condition it will give a yield of 24 tons, and when annealed at 1,000° C., 31 tons.

Heat Resisting Steels

The main development in heat-resisting steels during the past twelve or fifteen months has been the production of a quality lower in carbon and capable of being obtained in bars, plates, forgings, etc. This type offers a high resistance to heat, but a resistance not quite so high as the very best type, which, however, can only be obtained in the form of castings. While this latter steel resists heat to a greater extent than any other known steel, it is highly complex in composition, and difficult to work. It is also highly resistant to corrosion. In neither type of steel can tubes be made other than by casting, and tube castings are only practicable if the thickness of the walls is not less than ⅜ in. in a 2 ft. tube. Furthermore, the length of tube that can be satisfactorily cast is only 10 ft. Nevertheless, with all these drawbacks, there still remains a wide field of chemical engineering use for these steels, *e.g.*, as damper plates of furnaces, furnace tubes, bolts and nuts supporting furnace arches, pipe unions, burners, etc.

To show effectively the resistance to heat of these steels, one may mention that whereas 0.30 carbon steel loses 0.4 grams per sq. cm. per hour, the malleable stainless steel only loses 0.0015, and the heat-resisting steel of the casting type 0.0012. Again, making a comparison of the strengths of these three materials at 900° C., it is sufficient to indicate that the 0.30 carbon steel gives a maximum stress of 4.8 tons per sq. in., as against 11.4 for malleable stainless steel, and 17.4 for the heat-resisting steel. The pre-eminence of the last-named steel is readily seen.

A Group of Acid-Proof Chemical Stoneware Vessels as made by Doulton and Co., Ltd., Lambeth, London.

Acid-Proof Stoneware for Chemical Plant

A Brief Survey of its Application and Limitations

The use of acid-proof stoneware for chemical plant construction eliminates the corrosion problem. This ware resists the action of all acids normally encountered in industry, the only exception being hydrofluoric acid and hot strong caustic alkalis. Such stoneware, however, suffers from one disadvantage, for the compact wares do not successfully resist sudden changes in temperature, although this disadvantage has now been largely overcome by modifying the body of the ware, and by giving special attention to the selection of the clays which are used, care being taken to retain acid resisting qualities. For fairly high temperatures, as in the case of pipe lines which are intended to convey hydrochloric acid gas from salt cake furnaces, or for the supports of basins in a sulphuric acid cascade concentrator, wares with a certain degree of porosity are generally selected. Between these two limitations there has now been developed a range of densities suitable for meeting the varying requirements of nearly all chemical processes, with particular attention to temperature conditions obtaining in the plant.

Physical Characteristics

Regarding the principal physical properties of chemical stoneware, it may be pointed out that these have been considerably improved during the last few years. Normal tensile strength is now 1,000 to 2,500 lb. per sq. inch; compressive strength may be as much as 80,000 lb. per sq. inch. Thermal conductivity varies from 0.6 to 0.9 B.Th.U.; specific heat is about 0.19; and the co-efficient of expansion is in the neighbourhood of 0.0000025 per °F. The specific gravity of the body may vary from 2 to 2.5. From this data it will be seen that thermal conductivity is good in comparison with other ceramic products, but it is, of course, much lower than with metals. Thermal expansion is also low, indeed, much lower than with metals, being somewhere close to that of glass.

Chemical stoneware is glazed to give it a finish and not necessarily for the purpose of making it impervious to liquids. Small-sized units may be coated with an enamel glaze, thus providing a surface which is easily cleaned, but for large units, with pieces of intricate shape, the application of an enamel glaze is not always possible, and in this case salt glazing is resorted to. This particular glaze is produced by the volatilisation of salt which is thrown into the kiln when the maximum firing temperature has been reached, the actual glaze being caused by the soda uniting with the clay body to form a sodium aluminium silicate, whilst dense fumes of hydrochloric acid gas pass away by the chimney stack. Very heavy glazes of fusible clay which are applied by means of dipping or spraying, are not recommended, as the formation of pin holes or deep abrasion allows corrosive liquids to penetrate and ultimately causes the glaze to peal from the surface of the underlying body. Such glazes, moreover, are liable to crack when subjected to changes in temperature as there is a difference between the thermal expansion co-efficient for the glaze and the body. With salt glaze this disadvantage is entirely eliminated.

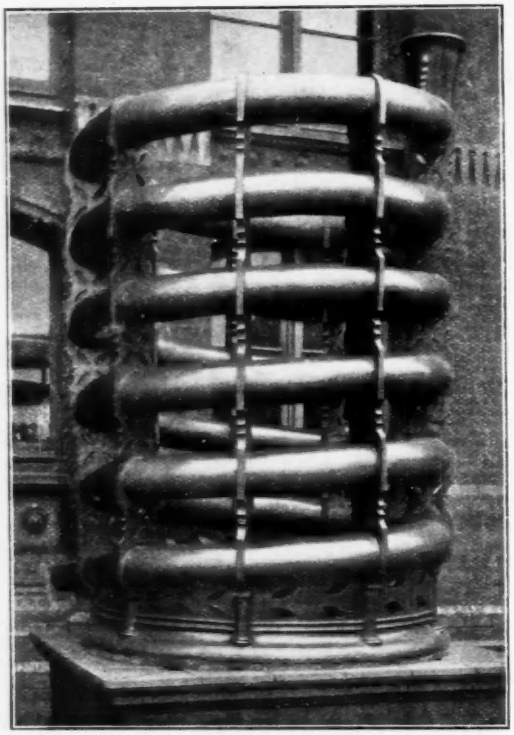
Vessels of circular cross-section are more convenient for manufacture as compared with oval or rectangular shapes, for these are distorted least by the strain of contraction during drying and firing operations. The manufacture of rectangular shapes often necessitates a number of duplicate pieces being put in hand to obviate delays in delivery following upon damage in the kiln. The firing operation as applied to chemical stoneware calls for considerable judgment on the part of the kiln man, as the water which is always present in the unburnt ware must be driven off slowly. The intensity of temperature in the kiln is another point which has to be taken into consideration, for wares of various sizes and thicknesses. In addition, it is necessary to regulate the admission of cooling air so as to produce a body of maximum toughness and high degree of imperviousness, and the ultimate soundness of the vessels depends to no small degree upon the precautions adopted in cooling the ware after it is removed from the kiln.

Acid Storage Vessels

For the storage of acids, stoneware vessels have many advantages. The shape usually adopted is one of the cheapest shapes for any given capacity and at the same time is the strongest mechanically. Normally where sulphuric acid is stored in lead-lined tanks any desired increased storage capacity usually necessitates the installation of a much larger tank than may actually be needed, but with the adoption of stoneware vessels storage capacity can be increased in small increments of say 100 to 200 gallons. In such a storage plant, consisting of a number of these vessels interconnected by

syphon pipes, the actual handling of the acid is facilitated. Lead-lined sulphuric acid tanks are liable to develop leaks at inopportune times and so become dangerous to employees and property, but this contingency is quite absent in the case of a stoneware vessel.

Chemical stoneware is now made in a great variety of forms, such as nitrating pans, equipped with stoneware stirrers; evaporating pans; absorption towers for scrubbing gases; pressure vessels; acid elevators, which are convenient units for raising corrosive liquids to higher plant levels by means of compressed air; stills, receivers, and condensing and cooling coils. One of the accompanying illustrations shows a group of vessels of British manufacture, included in which is a vacuum filter and an acid elevator, the latter being seen to the extreme right. A second illustration shows a large cooling coil. Such coils are used in the manufacture of acetic acid, for distillation purposes as well as for cooling the distilled acid, thus avoiding contamination by metals. They consist of a continuous helix of stoneware tube, which has a comparatively thin wall, supported on a substantial stoneware frame, but not attached to it in any way, so that the tube itself is free to expand and contract with changes in temperature.



A Typical Cooling Coil of British-made Acid-Proof Stoneware showing Supporting Frame.

Absorption Towers

Stoneware towers have almost unlimited applicability in chemical works where gases at or near normal pressure have to be brought into contact with liquids. It is false economy to build such towers from lengths of sewer pipe, as the cost of such an installation, together with periodical replacements, which are invariably necessary, is almost identical with that of a tower specially designed for absorption purposes. In designing these units a number of important factors have to be taken into consideration. For instance, the wall of the tower sections must be thick enough to have the necessary mechanical strength to resist the weight and side thrust of the packing rings which are placed in the tower to give reacting surface between gas and liquid. The walls, however, must be thin enough to permit the radiation of heat when the tower is used for the absorption of hydrochloric acid gas or for the recovery of nitric acid. Sockets must be wide enough to allow for the slight distortion to which chemical stoneware is subjected in drying and firing, but at the same time they must be small enough to make a satisfactory joint. Tourills of various forms are also used for absorption purposes, chiefly in the manufacture of hydrochloric acid, or in the recovery of hydrochloric acid as a by-product from the chlorination of organic compounds.

In nearly all chemical works there are opportunities for using stoneware pipes. Where these pipes are installed in buildings subject to vibration it is desirable to carry the pipe line on special supports; in other cases standard, adjustable pipe hangers are used, the hanger being placed near the socket portion of each pipe section. In the case of vertical pipe lines the weight of the pipe is carried by means of similar brackets beneath the sockets at intervals of 8 to 10 ft. The joints in these spiggot and socket pipes is made by using a suitable packing material which is sealed with acid proof cement. Pipes of smaller diameter ranging from one inch to four inches, used for conveying liquids, are connected by metal flanges or couplings which are tightened up by an adequate number of bolts. Manufacturers of chemical stoneware also specialise in supplying a very wide range of stoneware cocks, which can now be equipped with metal safety clips to prevent the plug jumping from its seating, thus causing loss of liquid with consequent hazards where acids are in use.

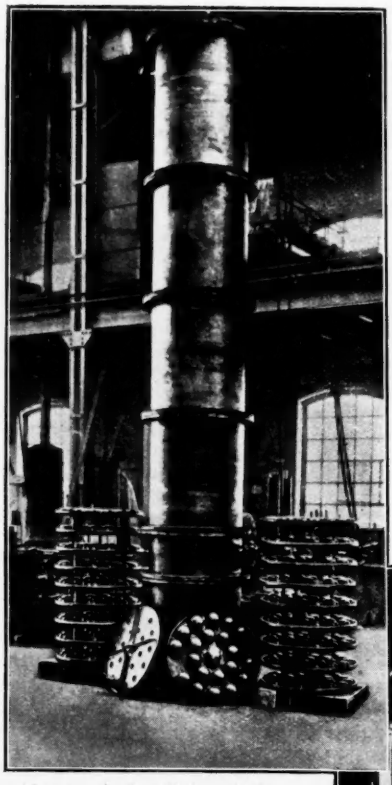
Industrial Air Conditioning

The Value of Automatic Thermostatic Control

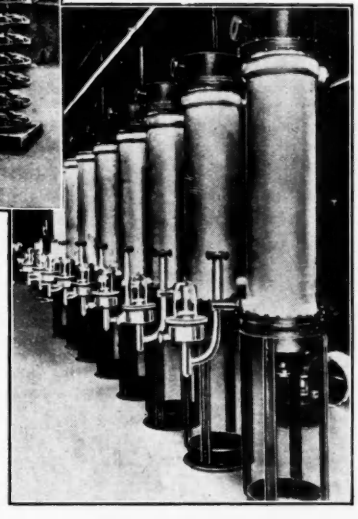
Only a few years ago industries using accurately conditioned air for their processes numbered not much more than a dozen, but to-day over 200 trades have recognised the advantages of the control of the moisture content and temperature of the air, and are operating on these lines. The general principle has been found to be of practical advantage in many ways unthought of before its adoption, including not only increased revenue because of the higher quality of the resulting products, but also the benefits in health and comfort of the employees. Each industry has its own particular problems that can only be overcome by creating atmospheric conditions best suited to the processes and conditions involved, and in this connection of great interest is the new "Sirocco" air conditioning apparatus recently introduced by Davidson and Co., Ltd., Belfast. This allows of perfect ventilation being obtained by clean washed air, free from dust and impurities, under conditions of constant temperature and relative humidity, easily varied as required and kept to within plus or minus 1° F. of the desired figure. This is due mainly to the use of completely automatic thermostatic control, which eliminates the human control and is independent of outside fluctuations.

Essentially the apparatus consists of preliminary heater, air washer (for cooling and humidifying), re-heater and centrifugal fan while the constant temperature and relative humidity are obtained by dew-point control. The required conditions in the room are known and stated in dry and wet bulb thermometer readings reduced to a basic dew-point. For example, 70°F. dry bulb and 63° F. wet bulb is equivalent to 66 per cent. relative humidity, and has a "dew-point" of 58° F., i.e., air at 70° F. dry bulb and 60° F. wet bulb would be fully saturated when reduced in temperature to 58° F. while below this some of the contained moisture would be precipitated.

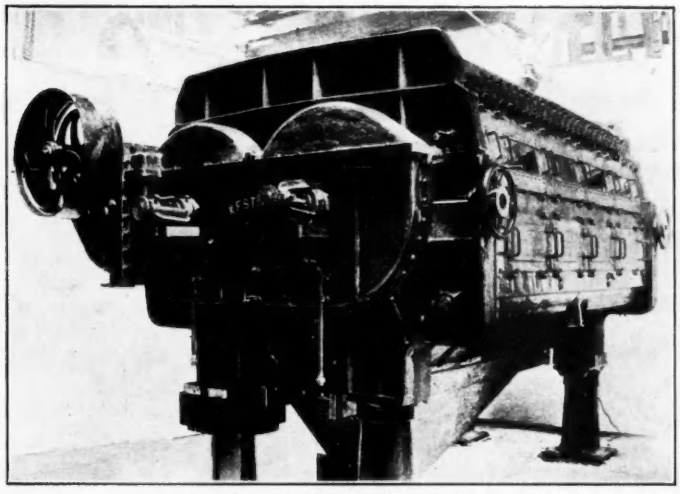
The outside air enters at any temperature and humidity, but is so treated by the preliminary heater and washer that it cannot leave except at the pre-arranged temperature of 58° F. For this purpose automatic controls in the shape of special thermostats are fixed at the washer outlet and also in the room or building treated. The washer thermostat is sensitive to a 0.25° F. change in temperature and this change is transmitted by the steam supply valve controls to the preliminary heater and washer water, opening or closing them as required, without manual adjustment. The room thermostat operates the main re-heater valve in the same way, so that if heat is added to the room by the sun or otherwise, less heat is given by the main heater to adjust the total exactly, while if heat is abstracted from the room more is given by the apparatus, to keep the required conditions unchanged. Humidity and cooling is affected by banks of spray nozzles which atomise the water and mixes it with the incoming air, a suitable high pressure pump being supplied for this purpose.



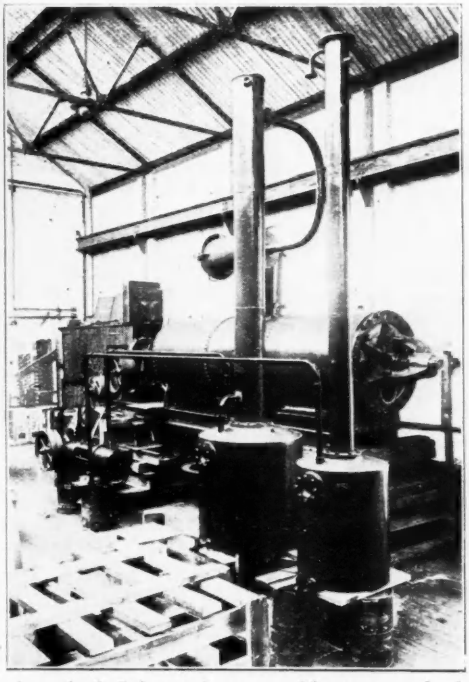
Above: A Rectifying Column of the "cap" type, showing form of internal plates (G. A. Harvey and Co., Ltd.)



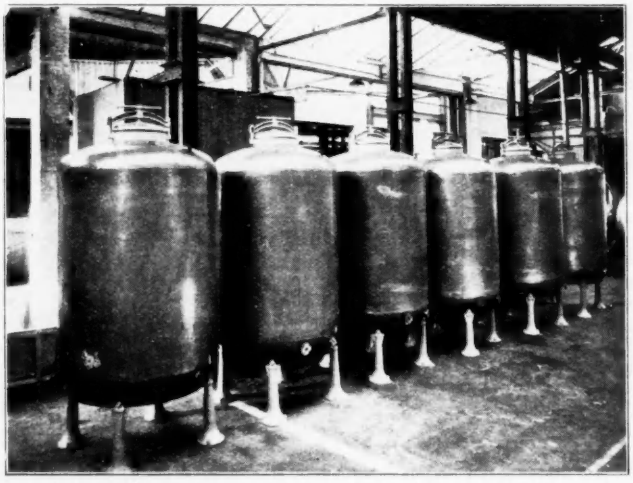
Right: Surface Condensers for distillation plant, equipped with "still watchers" (G. A. Harvey and Co., Ltd.)



Patent Double Drum Drier, operating under vacuum, as used for delicate materials which enter in the form of a solution and leave as dry powder (Kestner Evaporator and Engineering Co., Ltd.).



A typical Solvent Recovery Plant as made by W. J. Fraser and Co., Ltd.; as shown, this plant is erected for testing prior to despatch from the works.



A batch of Autogenously Welded Copper Vessels forming part of a bulk storage scheme supplied by The Aluminium Plant and Vessel Co., Ltd.

Some Recent Contracts in British Chemical Plant

Catalysis: Its Modern Aspects

By P. K. Frolich

The following extracts are taken from a paper presented before the Division of Industrial and Engineering Chemistry at one of the recent meetings of the American Chemical Society. The author is associated with the Standard Oil Development Co., of Elizabeth, N.J.

IN going about his daily routine, the chemist as a rule does not give much thought to the part played by catalysts in modern industrial chemistry and yet a great many of the most important articles of chemical manufacture are the outcome of catalytic processes. Examples of such operations are the manufacture of sulphuric acid by both the lead-chamber and contact processes, the oxidation of ammonia to nitric acid, and the production of quantities of hydrogen: these in turn are consumed in other catalytic reactions, such as the now so widely employed hydrogenation of vegetable and animal oils and the synthesis of ammonia. Other illustrations are the manufacture of all kinds of rubber articles, the hydrolysis of starch to dextrine and sugars, the splitting of fats and oils to fatty acids and glycerol, and a variety of organic chemical processes, such as many of those met with in the manufacture of dyes and medicinals.

Mechanism of Catalysis

In spite of the extensive fundamental studies of the subject being conducted by both universities and industrial concerns, present knowledge of the mechanism of catalysis is rather limited. While it is now generally agreed that the formation of intermediate compounds of one type or another play an important part in catalytic phenomena, it is still largely a matter of speculation just why platinum, for example, should combine with elementary oxygen in such a manner as to render it available for oxidation of sulphur dioxide to trioxide. A satisfactory answer to this fundamentally important question of the true mechanism of activation would be of far-reaching consequence and might eventually make it possible to choose the proper catalyst for any chemical process, much in the same manner in which the free-energy change of chemical reactions can now be calculated. A solid catalyst must be pictured as possessing a highly developed surface structure, composed of partly unsaturated atoms or molecules whose free valences are capable of interacting with the constituents of a given chemical system. It is to this surface layer, which constitutes only a small fraction of the total material, that the catalyst owes its activity.

As for the practical side of the subject, it is evident that, besides numerous major and minor improvements in existing industries, the most striking developments of the last decade are in the field of hydrogenation catalysts and processes concerned with their use. The important contribution here is the discovery of the hydrogenating power of a great variety of metallic oxides. Heretofore a limited number of metallic catalysts, such as nickel, platinum, and palladium, were available for hydrogenation purposes, but the oxides offer certain decided advantages, such as a greater degree of selectivity with respect to the chemical reactions they cause to take place, and a marked resistance to the ordinary catalyst poisons as well as to changes in temperature. The exploitation of this new type of catalysts has led to some extremely promising results, the full significance of which can hardly be properly gauged at this early date.

Synthesis of Aliphatic Compounds

The first point to be noted is that it is possible to synthesise aliphatic compounds of a great variety of types by a series of stepwise reduction and condensation reactions, starting with as insignificant a raw material as the oxides of carbon. Now so much has been said and written about these processes that there is no justification in devoting much time to the subject. It will be sufficient to mention that by the proper choice of metallic oxides one may synthesise methanol and higher alcohols from a mixture of carbon monoxide and hydrogen, and that methanol may also be produced from carbon dioxide, available as a by-product from many industrial operations. Likewise, lower alcohols may be converted into higher ones which are more valuable for use as solvents and for other purposes, or the process may be directed toward the formation of aldehydes, ketones, acids, and esters, which all have their specific uses in industry.

Saturated and unsaturated hydrocarbons are other possible products, but admittedly of lesser commercial importance. Although it is gratifying to note that some of these reactions already have been exploited successfully on a commercial scale, as evidenced for example, by the manufacture in this country of methanol in quantities equivalent to, or perhaps even exceeding, that of the production of wood alcohol, the real value of this recent contribution to catalysis does not lie in such immediate industrial applications, but far more in the fact that it is gradually bringing about a profound change in the concept of aliphatic organic chemistry.

Changes in Structure of Hydrocarbons

Until a short time ago the chemist looked upon coal tar as the very foundation of aromatic chemistry, while petroleum and its products were supposed to belong in the realm of paraffins and the more obscure naphthenes. Very few bridges existed between these various groups of hydrocarbons, one of the most noteworthy being the transformation (probably known on a laboratory scale only) of benzene into cyclohexane, and vice versa. Thermodynamic considerations indicate, however, that all the various groups of hydrocarbons are interrelated in such a manner that it should be possible, by the proper choice of experimental conditions, to convert one type into another almost at will. In other words, the character of the products of coal carbonisation and petroleum cracking is not so much an inherent quality of the raw materials but is largely dependent upon the particular conditions of temperature and pressure under which the thermal breakdown takes place.

The introduction of high-pressure hydrogenation has now solved this difficulty by bringing the hydrogen-carbon ratio under control. In this process, hydrogen, activated by means of the previously mentioned metallic oxide catalysts, is foisted upon the hydrocarbon structure in such a manner that the molecules may rearrange themselves without serious interference from the progressive dehydrogenation reactions which lead to losses in the form of constituents deficient in hydrogen. By operation under hydrogenating conditions, the flexibility of the system is therefore increased to such an extent that aliphatic-type hydrocarbons may be transformed into naphthenes and aromatics, and vice versa, with high efficiency. It is possible in commercial operation to convert heavy refinery residues into distillate oils, to produce remarkably high yields of aromatic-type gasoline from paraffinic stock, and to improve the quality of lubricating and burning oils by changing the molecular structure. The persistent demands for better motor fuels and lubricants will undoubtedly be a stimulant to continued progress in this field.

Danger of Too Many Synthetic Methods

Supplementing the previously known technique of organic chemistry and catalysis with this new type of hydrogenation catalysis means the realisation of transmutations of matter to an extent hitherto not thought possible. The point may be raised, however, that so far the results of these new developments have not been wholly encouraging. For one thing it cannot be denied that new synthetic methods of the types discussed here were instrumental in causing the recent breakdown of the solvent market.

If the industry is equipped to produce twice or three times as much methanol and acetone as the country needs, and if there is a large potential excess of ethyl and higher alcohols, acetic acid, and esters, why should not a healthful application of the same research methods, which originally led to their synthesis, in the next round result in the utilisation of these very products for the manufacture of other commodities which can be absorbed by the market? Bearing in mind that glucose, artificial silk, butyl alcohol, acetone, furfural, and other materials are being derived from farm products, may one not be justified in going a step farther and suggesting that chemistry be called upon to find outlets for the country's agricultural surplus in the manufacture of new products.

The Need for Pure Water in Industry

Report of The Water Pollution Research Board

The part which scientific research is taking in meeting the ever increasing demand for a plentiful supply of pure water is reviewed in the fourth annual Report of the Water Pollution Research Board for the year ended June 30, 1931, which was issued, together with the Report of the Director of Water Pollution Research, on January 20 (H.M. Stationery Office, 9d. net).

THE available sources, both surface and underground, of unpolluted water are gradually being depleted and there is no doubt that many rivers which are at present to some extent polluted will have to be utilised in the future as sources of supply, after treatment, for both domestic and industrial purposes. The co-operation of the authorities and industries concerned is of the utmost importance. Close contact between the investigators and the various interests and free exchange of information ensure that the different aspects of each problem are properly understood, and lead to the more rapid adoption on a commercial scale of any satisfactory processes which may be devised.

Exact knowledge regarding the flow of water from the upper Tees and movements of water in the estuary and tidal portions of the river below Stockton has been obtained from a hydrographical survey of the river. The average volumes of water passing various points in the estuary at different ranges of tide have been calculated. It appears that at depths below one fathom the water has a definite tendency to move up river over each period of ebb and flood, while the water in the surface layer has a strong net movement down river. The conclusion is, therefore, that polluting matter cannot escape seawards easily unless it is in the surface layer. In fact it is suggested that several days may be required for dissolved substances occurring in water at Stockton to reach the sea.

Effects of Pollution

In a zone from Middlesbrough to Stockton, plant and animal life on the river bed are practically absent. This zone is subject to the greatest effects of pollution by sewage and effluents which contain specific poisons and which lower the concentration of dissolved oxygen in the river. This, however, is also the zone in which the greatest changes in salinity occur, and the complementary experiments in the corresponding zone in the Tay estuary, which is comparatively unpolluted, have shown that the scarcity of life in the central part of the Tees estuary cannot be attributed solely to pollution. Some 2,500 smolts of trout and salmon found dead or dying in the upper part of the Tees estuary have been collected. From an examination of these it appeared that their death could not be attributed to oxygen shortage alone. Chemical analysis of the effluents showed the presence of phenol and other tar acids, hydrocarbons such as naphthalene, and in some cases of cyanides, the latter in concentrations which were found to be lethal to smolts under experimental conditions.

The distribution of the various toxic substances in the estuary of the Tees depends not only on the rate at which they are discharged and carried out towards the sea, but also on the rate at which they are broken down by bacterial or chemical action in the water. The course of this decomposition is being studied by chemical methods and experiments are being made on the rate of decrease of toxicity towards trout of various effluents and constituents of when diluted estuary water and stored. In the upper reaches of the Tees a large volume of sewage enters the river at Croft but for about 20 miles below this point there is no considerable source of pollution. This is, therefore, a convenient stretch of water for studying the breakdown of the sewage in the river. It has been found that temperature is the important factor. In summer the river purifies itself more rapidly and completely than it does in winter. In fact in summer the river is practically pure at Eryholme, about six miles from Croft, while in winter the self-purification may not be complete before the industrially polluted zone is reached..

Considering the disposal of polluting effluents from any particular industry, the Board points out that the first logical step is to ascertain whether it is practicable so to modify manufacturing processes that no polluting effluents need be discharged. In some cases it may be possible by simple treatment to render the wastes fit for re-use in the factory operations, and the polluting character of the effluents may be reduced by the recovery of products of value.

Laboratory experiments have been continued on the purification of waste waters from beet sugar factories by the process of biological oxidation on percolating filters and further progress has been made in the investigations of the base-exchange process of water softening and of the activated sludge process of treatment of sewage. Arrangements for an investigation of the colloids in sewage and in beet sugar factories effluents were made last year, but before the main part of the investigation could be commenced, it was found necessary to carry out a large number of preliminary experiments for the purpose of selecting and devising satisfactory methods of analysis and examination of the various samples. This preliminary work has been completed and the main part of the investigation is now in progress. In connection with the investigation of the causes of the corrosive and plumbo-solvent action of certain waters on mains and service pipes, and on methods of treatment to prevent such action, several water works have been visited, the literature has been examined, and a summary of existing knowledge of the subject is in preparation.

Beet Sugar Factory Wastes

Preliminary laboratory experiments during 1927 on several possible methods of purification indicated that the process of biological oxidation on percolating filters offered the greatest promise of success, and the investigation was accordingly extended to include experiments on a semi-commercial scale. For this purpose, two circular filters, each 25 ft. in diameter and approximately 6 ft. in depth, and two rectangular filters, each 3 ft. square and 6 ft. deep, together with the necessary auxiliary equipment and a laboratory, were erected at the beet sugar factory at Colwick, near Nottingham, where facilities were provided through the kindness of the Anglo-Scottish Beet Sugar Corporation, Ltd. The semi-commercial scale experiments were continued until last year, when they were temporarily suspended. Laboratory experiments have been carried on continuously since 1927 at the Rothamsted Experimental Station and they are still in progress.

It has been definitely shown that a high degree of purification, of the order of 90 per cent. for press water, the most polluting of the effluents, can be achieved by the process of biological oxidation on percolating filters; at the same time, the conditions of operation necessary to attain this high purification have been demonstrated. The investigation has included a study of the biological and chemical changes which occur in the filters, the fauna and flora, and the influence of such factors as the rate of filtration and the nature and size of the filtering material.

Base-Exchange Process of Water Softening

The investigation, which is in progress at the Department's chemical research laboratory at Teddington, on the base-exchange of zeolite process of water softening has provided useful information on the properties of different types of base-exchange materials. The exchange values of typical commercial materials have been determined at different rates of flow of water and after various methods of regeneration. The effects of variations in the composition of the water are at present under investigation. One series of experiments has shown that base-exchange materials may be regenerated by treatment with sea water in place of the solutions of common salt ordinarily employed. Owing to the presence of calcium and magnesium in solution, however, sea water is not so effective as a solution of common salt containing sodium ions in the same concentration. The interesting observation has been made that base-exchange materials satisfactorily remove from water traces of such undesirable metals as lead, tin, copper and zinc which may be present in solution.

Experimental work on the biological changes which occur during the treatment of sewage by the activated sludge pro-

cess has been continued for the Department in the laboratories of the London School of Hygiene and Tropical Medicine under the immediate direction of Professor W. W. C. Topley. The changes in the counts of total and viable bacteria as the process of purification proceeds have been followed and the results have been correlated with the changes in the composition of the sewage as determined by chemical tests. Experiments have also been made to ascertain the action of bacteria in the test for dissolved oxygen taken up in five days as ordinarily applied to sewage effluents. Both biological and physico-chemical processes take place during the purification of sewage by the usual methods, but there is a lack of exact information regarding those processes. The Department arranged for an investigation of the colloids in sewage and the conditions which affect their quantity and nature to be carried out at University College, London, under the immediate supervision of Professor F. G. Donnan. The preliminary experiments, which were commenced in March, 1930, soon led to the conclusion that although the part played by colloids in sewage purification is probably important, the total quantity of colloidal matter is very small.

Gasworks Effluents

The Research Committee appointed by the Institution of Gas Engineers in 1926, to consider methods of overcoming the difficulties associated with the disposal of liquor effluents from gasworks has continued its inquiries and has now issued a fifth report. In a section of the report relating to methods of reducing the higher tar acid content of ammonia liquor, a description is given of further experiments made with an electro-static tar precipitator at the Hinckley gasworks. The experimental results have shown that the removal of heavy tar from the crude coal gas before the condensation of liquor takes place causes a marked reduction in the higher tar acid content of the liquor. The monohydric phenol content of the liquor, however, was increased from about 0.35 to 0.58 gm. per 100 ml., but monohydric phenols can be more readily removed than higher tar acids by solvents or by evaporation.

Experiments on the evaporation of effluent liquors on the producer bars of an installation of coal carbonisation retorts have demonstrated that the water ordinarily employed may be replaced by effluent liquor. In this manner, approximately 40 per cent. by volume of the total effluent, comprising the whole of the devil liquor and about 30 per cent. of the spent liquor from the still, was evaporated. The Committee's research chemist made a second visit to Germany to inspect recent developments in the methods in operation there for the recovery of phenols. The general principle adopted in most of these plants is the removal of phenols from the liquor by washing with benzole, and the recovery of the phenols from the benzol as sodium phenolate solution by the use of soda. In the Ruhrverband area a plant has been erected in which active carbon is used for the removal of phenols from ammonia liquor. Under German conditions, phenol recovery appears to be profitable when the phenol content of the liquor is greater than about 0.3 gm. per 100 ml.

The Report states that it is now recognised that the setting up of manufactories in areas not previously industrialised, which has taken place since the war, need not be accompanied by the gross contamination of rivers which was a feature of the growth of industry and population in the nineteenth century, especially in the North of England.

Official Analytical Methods

Work of the U.S. Association of Official Agricultural Chemists

THE Association of Official Agricultural Chemists at Washington has issued a third edition of its *Official and Tentative Methods of Analysis*, which was first published in 1920. Although the general arrangement of this new edition is similar to that of the first and second editions there has been a certain number of re-arrangements for data included, as well as additions and deletions which are worthy to be mentioned. The subject matter is broadly grouped into two divisions, non-foods and foods. The first division includes chapters on soils, fertilisers, liming materials, insecticides and fungicides, oils, fats and waxes, tanning materials and water, thus bringing together related subjects, whilst the later chapters, devoted to foods, are arranged in alphabetical order and include such groups as baking powders, beverages, beers and wines, coffee and tea, cereal products, colouring matter in foods, dairy products, grain and stock feeds, meat products, fruit products, preservatives, sugars, spices, flavouring extracts, and others. This permits of easy reference and meets the needs of a laboratory handbook in an admirable manner. In all, the new material and tables amounts to more than 100 pages, out of a total of 590 pages.

As evidence of the progressive development of the work of the Association is the inclusion of new chapters on caustic poisons, naval stores, paints, and eggs and egg powders. Chapter headings have also been assigned to such subjects as sewage, fibres, paper and paper materials, nut products, etc., indicating activities which the Association has begun or is planning to undertake. There are also chapter headings assigned to microchemical methods and bacteriological methods, as the interests of the agricultural chemist has so broadened in recent years that he finds it necessary to be professionally equipped to deal effectively with all matters which come within the scope of research and control.
control.

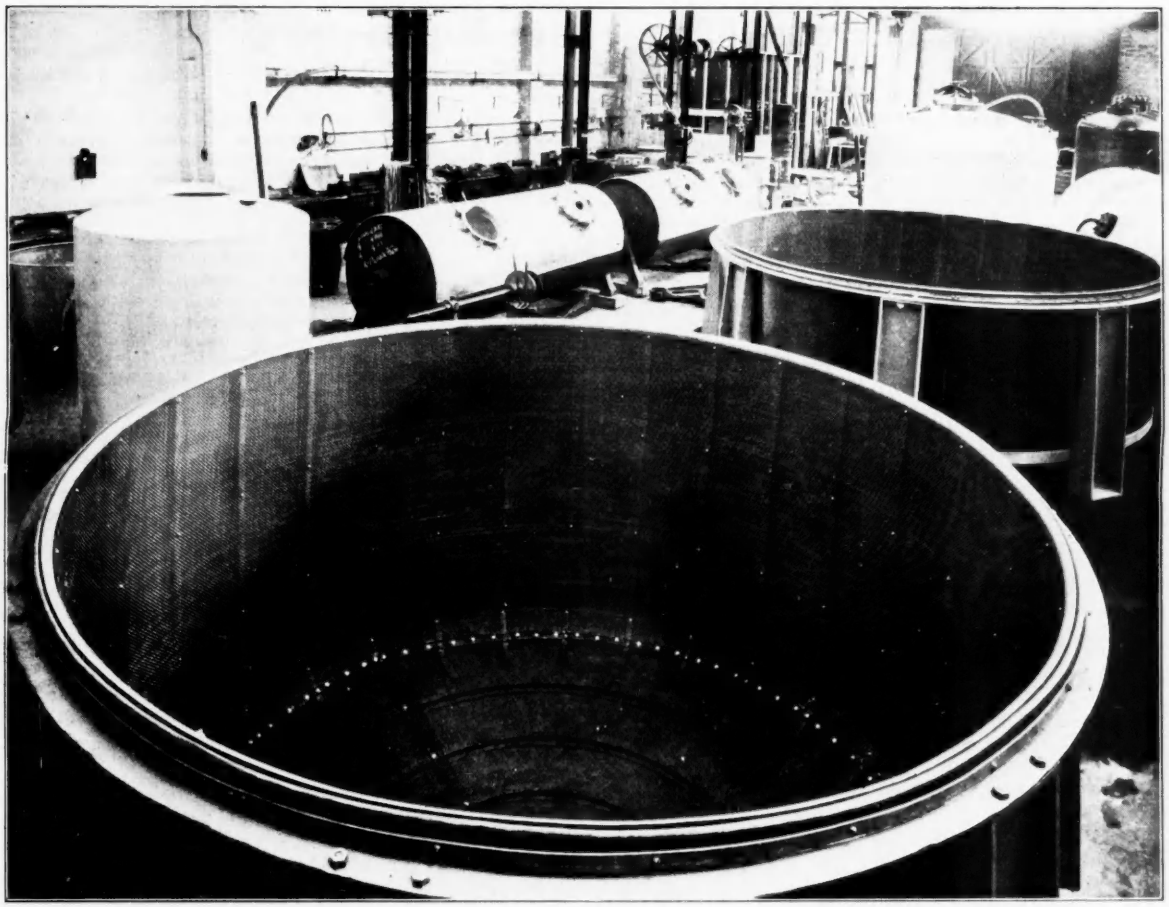
Tentative and Official Methods of Analysis

As hitherto, the methods given are classified as official and tentative. In addition, a note is made of those tentative methods which have received first action as official. This classification is important to those who use these methods to support action before the courts, since they are accredited by the United States Secretary of Agriculture in law enforcement work.

The methods adopted by the Association of Official Agricultural Chemists are unique in several respects. They are the outgrowth of continual critical collaborative trial or test participated in by a large number of workers and undertaken in order to establish the accuracy of analytical results. They are also subjected to a scrutiny of phraseology to ensure clarity, and are formulated solely by responsible federal and state officials acting together and are thus based on underlying principles of equity. From 1884 to 1894 methods of analysis were published each year as a bulletin of the Division of Chemistry of the United States Department of Agriculture: special bulletins appeared at subsequent dates until in 1920 the collected methods of analysis were first presented in book form under their present title.

The Work of the Referee

Membership of the Association is institutional and includes the State Departments of Agriculture, the State Agricultural Colleges and Experimental Stations, the Federal Department of Agriculture, and the federal, state and city offices charged with the enforcement of food, feeding stuffs, drug, fertiliser, insecticide and fungicide control laws. To attain the aims of the Association for a set of accurate methods, a referee is appointed for any particular subject for which the Association has not yet formulated official methods or for a method which seems to require further investigation. The referee then conducts analyses according to the methods suggested for adoption in comparison with methods which are already established, obtaining the collaboration of as many of the workers in that field as is possible. In addition a great deal of original research has been inaugurated on new methods. This system has been developed logically until at the present time, in order to be adopted as "tentative," a method must be recommended to the Association by the referee, and such recommendation is made only after the method has undergone a thorough collaborative and critical study. Finally, in order to become "Official" the method must be accepted at a subsequent annual meeting of the Association. The recommendations of the referees are published periodically in the *Journal* of the Association, so that all tentative methods are made public before being adopted, and this permits consideration and criticism by chemists who are not actually members of the Association.



This large copper vessel is autogenously welded and the entire interior surface is covered with fine copper wire mesh. It was made by The Aluminium Plant and Vessel Co., Ltd., being one of a series of such vessels designed for use in the dissolving and preliminary straining of certain chemical products. Two horizontal aluminium storage tanks of the insulated type, equipped with special manholes and mounted on trunnions, may be seen in the background.

Phosphate Rock Statistics for 1930

Notable Increase in Quantity Mined

THE most interesting feature of the statistics of phosphate rock production during the year 1930 as reviewed in the current issue of *Superphosphate* is that, despite the fact that the world slump was strongly in evidence for the greater part of the year, the quantity of phosphate rock mined was nearly 1,400,000 tons in excess of the output for 1929. Practically the whole of the increase occurred in North Africa, where 6,265,133 tons were mined, as compared with 5,112,885 tons in 1929; there was an advance of 180,000 tons in European domestic production due to substantially increased output in Belgium and Russia; America had a small increase of 168,000 tons, but the various producers of the Pacific Ocean recorded a decrease of 98,700 tons.

For the Nord African increase there was a special reason. During 1929 the output from the mines was relatively small owing to serious labour difficulties in Tunisia and Algeria, and the statistics reveal that the sales for 1929 exceeded production by no less than 664,000 tons. In 1930 production was in excess of sales by 764,000 tons, hence the increase in production in this important phosphate mining centre, totalling 1,153,000 tons, was in part absorbed by increased sales (389,000 tons) the balance going to replace stocks depleted during the preceding year.

The total world production in 1930, viz., 11,814,470 metric tons, was a record which may not be attained again for some years. The increase in the output of phosphate rock since 1924 has been extraordinary, as the following comparative figures show:—

	Tons
1924	7,780,213
1925	8,896,856
1926	9,375,351
1927	9,987,938
1928	10,095,303
1929	19,428,698
1930	11,814,470

In six years production has therefore advanced 52 per cent. and is now evidently outrunning the possibilities of consumption, because in the last three years—1928, 1929 and 1930—superphosphate production has remained relatively stable at about 15,250,000 tons. At least 85 per cent. of the consumption of phosphate rock is for superphosphate manufacture, and the alternative uses to which phosphate can be put are not likely to expand to any very material extent even in normal times. The manufacture of 15,250,000 tons of superphosphate requires 8,472,200 tons of phosphate rock, hence an annual production of, say, 10,100,000 tons would have covered the world's needs of phosphate for the past three years.

The phosphoric acid content of the phosphate rock produced was 3,720,179 tons, as compared with 3,351,159 tons in 1929, an increase of about 369,000 tons. It is of interest to note that the average grade produced was higher in 1929 (32.13 per cent.) than in 1930 (31.49 per cent.).

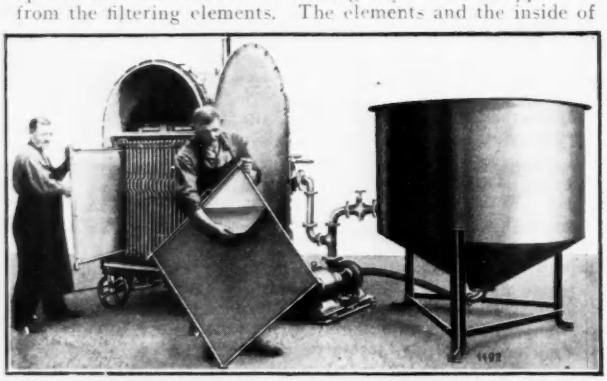
Chemical Plant and Engineering

Notes on Some Modern Developments

British chemical plant manufacturers, by their research, industry and enterprise, have made an invaluable contribution to the industrial progress of this country, and the rapid advance in technique which accompanies the changing demands in chemical science and engineering finds them constantly apace with the production of new and improving equipment. Our advertisement pages from week to week testify to the enterprise of many of the plant manufacturers, and the following notes review some recent developments in the making of plant and the lines which are being pursued by a number of well known business firms.

Improvements in Filters

FILTERS which are definitely suitable for the separation of liquids and solids, the liquid being the valuable constituent whilst the solid is discarded as valueless, have recently been introduced to British chemical industry by John C. Carlson, 149 Farringdon Road, London, E.C.1. This Seitz alluviation filter is suitable for freeing large bulks of liquid from extremely fine, partly colloidal suspended impurities which are both small in weight and volume. It works on an entirely new principle, and filtering medium consists of a specially prepared fibrous mixture of asbestos and cellulose, which is deposited as a paper-thin layer on fine wire gauze, to give a clear filtrate, even when dealing with the finest suspensions. The filtering elements as shown in one of the accompanying illustrations, are housed in a filter case, one side of which is utilised as a door. The elements themselves are flat rectangular frames spanned on both sides by fine wire gauze, on to which the asbestos filtering material is deposited. In setting the filter, the asbestos filtering material, used at the rate of 3 lb. per 100 sq. ft. of filtering surface, is mixed with a portion of the unfiltered liquid and is circulated in the mixing vessel for ten to fifteen minutes, and then pumped into the filter. From the filter the prefilt is led back to the mixing vessel and thence to the filter and so on until all the asbestos filtering material has been deposited on the fine wire gauzes, and the filtrate runs clear. According to the nature and viscosity of the liquid being filtered, this will take from five to ten minutes. The filter is now ready for the main bulk of the liquid, which is best fed from a tank situated ten to fifteen feet above the top of the filter; if such a tank is not available a pump may be used to feed the filter. When filtration has been completed the filter is run or pumped empty and compressed air is led into it for a period of two or three minutes, at a pressure of 3-4 lb. per sq.in. This serves to dry the filtering layers as far as possible and to remove the last traces of liquid from them. The door of the filter is then opened and the exhausted filtering layers are stripped off from the filtering elements. The elements and the inside of

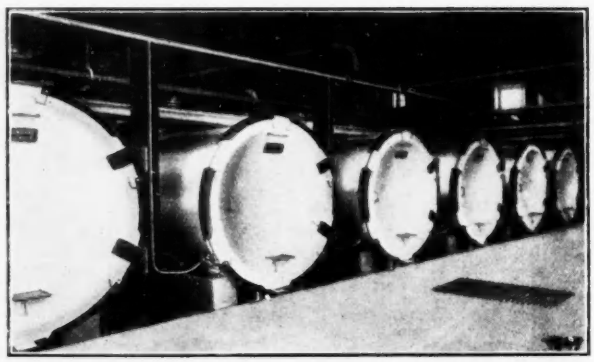


THE SEITZ FILTER SHOWING METHOD OF STRIPPING THE FILTER FRAMES. (JOHN C. CARLSON.)

of the filter are then washed with a strong jet of water and when reassembled the filter is ready for further use.

By varying the proportions and fineness of the asbestos and cellulose it is possible to vary the filtering power, and various grades of material are manufactured. It is thus possible to select a filtering material which is suited to any liquid and the maximum output combined with the highest degree of clarity of the filtrate is obtained.

The field of application of this filter is limited in that it can be used only for liquids containing a relatively small amount of valueless suspended matter. In general the amount of suspended matter should not exceed 0.5 per cent. by volume but the filter can often be used with advantage in certain cases where this condition is not fulfilled, as when part of the suspended matter settles quickly, leaving only the



A BATTERY OF SEITZ FILTERS AT A MODERN BEET SUGAR FACTORY. (JOHN C. CARLSON.)

finest particles in suspension. In such a case the greater part of the liquid is separated from the precipitate and passed through a Seitz filter, whilst the sediment is treated separately in a filter press.

Oil Refining

In the production of vegetable and animal oils the Seitz Filter can be used at several stages. In some cases it can be applied with advantage to the filtration of the crude oil. It is also used for the filtering out of the soap stock, replacing the old process of numerous washings with water. The chief application, however, is in the final filtration of the refined oils. Here the Seitz filter has certain great advantages for this particular purpose. Firstly, it is capable of giving the necessary very high polish to the oil, secondly, the filtration is carried out in an entirely closed system; thirdly, the asbestos filtering material is quite neutral and free from taste, so that no foreign taste is imparted to the oil; and fourthly, fresh filtering material is used for each operation, so that no undesirable impurities can be carried on from one batch of oil to another.

The Seitz filter also finds very great scope in sugar manufacture, particularly in dealing with beet sugar. Large installations are running for the filtration of raw juices direct from presses, both with and without the addition of small percentages of lime, and for thin and thick liquors. In the refineries, plant has been installed for the filtration of raw sugar liquors, carbon treated liquors and syrups. The second illustration shows an installation of these filters dealing with raw sugar liquors at a well known beet sugar factory.

Artificial Silk Manufacture

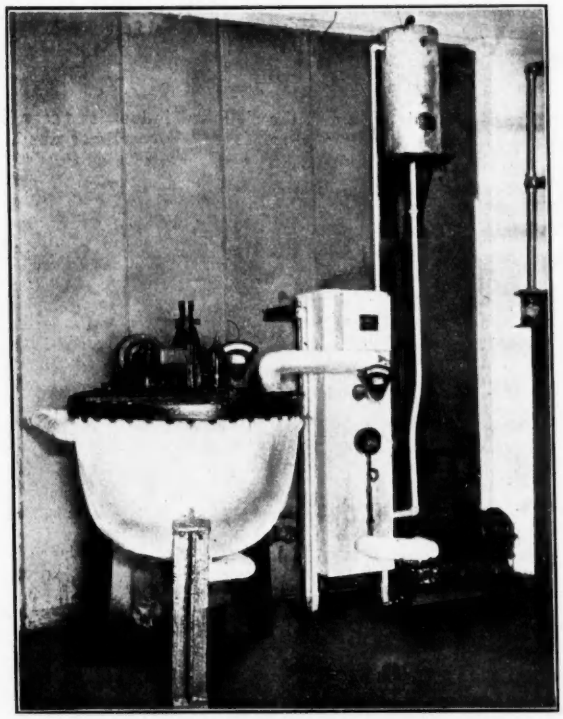
In this industry water, spinning baths, sodium hydroxide, sodium sulphite and sulphide, calcium hypochlorite and soap solutions present filtration problems. Here the Seitz filter gives an absolutely crystal clear filtrate, requires the minimum attention and is cheap to maintain. These are the three chief considerations in the artificial silk industry, as the presence of the slightest traces of impurity in the various process liquids does great damage to the silk and such huge quantities have to be dealt with that economic working demands cheap maintenance and a minimum of supervision. Recent experimental work indicates that a further field may be found in the filtration of viscose, using ready made

filtering sheets for this purpose instead of the loose asbestos used as filtering material.

In the production of many chemicals the Seitz' filter is also particularly useful, especially in the case of crystallisation liquors, for by reason of its high filtering power it removes those very fine particles which tend to hamper the course of crystallisation. In textile dyeing operations it can be used for the filtration of dyeing oils, such as sulphonated olive oil, dressing oil and Turkey red oil, and for a filtration of the dyeing bath after it has been regenerated by the addition of a further quantity of dyestuff. Particularly successful results have also been obtained in the filtration of mercerising liquors. As an additional instance of its application may be mentioned the filtration of cellulose lacquers, where partially nitrated fibres invisible to the eye are completely removed.

Plant Heating Installations

Amongst plant manufactured by the Kestner Evaporator and Engineering Co., Ltd., of 5 Grosvenor Gardens, London, S.W.1, there has, during the past year, been a continued extension in the use of the Kestner patent oil circulation heating plants, which so successfully fulfil the needs of problems requiring high temperatures with even heating, automatic and close temperature control. This system has a number of advantages over direct firing with gas or other fuel, and shows a distinct saving in running costs. In certain cases where



Kestner Electrically-heated Oil Circulation System as applied to a Jacketed Vessel.

reaction vessels have to be heated to some 600° F. it is required to cool the contents after reaching a certain stage in the reaction, and plants have recently been installed employing the above system for the heating in conjunction with a special cooling system working on similar principles.

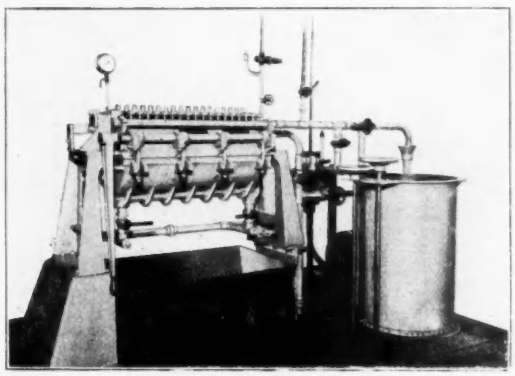
This company has also developed an electrically-operated oil circulation plant, entirely automatically controlled. As its efficiency is well over 90 per cent., the operating costs are favourable with reasonable prices for the supply of electricity. In many cases, this forms an ideal system for small units, as the plant occupies an area of only a few square feet, and is easily erected and connected to the electrical supply. The accompanying photograph shows a typical installation of a jacketed reaction vessel and electrically-heated oil circulation plant. This plant is entirely electrically and automatically operated, and maintains the temperature of the contents of the reaction vessel constant with 1° or 2°. Although the final temperature in the vessel is about 600° F., the pressure in the jacket does not exceed 15 lb. per square inch. The space occupied by the plant is extremely small, and that the whole forms a self-contained unit.

Whilst the use of the patent oil circulation heating system gives excellent results for temperatures up to 600° F., there are an increasing number of problems requiring still higher temperatures, and for this purpose fluid heat tranmission systems have been developed employing media which will withstand still higher temperatures, a typical example of such a medium being diphenyl. Diphenyl is not, at the moment, manufactured in Great Britain, but the Kestner Evaporator and Engineering Co. are sole agents for this product as produced by the Swann Chemical Co., of America. Temperatures up to 750° F. can easily be obtained without the use of excessive pressures, and the advantages of even heating and high rates of heat transmission also apply. A number of patent plants electrically-heated for obtaining high temperatures, have also been developed, a typical example being the electric heating of linseed oil for the manufacture of varnish. With this system, low temperature drops are utilised, with large heating surfaces, resulting in quick and even heating, so that the oil can be heated to temperatures of 650° F. in a period of an hour with reduced decomposition and fume losses. Another interesting type of electrically heated plant is a continuously operated still for distillation of fatty acids, etc., where temperatures up to 800° F. can easily be obtained. Since the material is in contact with the heated surfaces for only a minute or two, any temperature effect is considerably less than by distilling in large batches with direct firing.

The active development of the Kestner patent spray drier continues, and, amongst recent advances, the production of a new type of atomiser may be mentioned. This patented atomiser has increased the possible applications of the spray drier considerably, and by its use the need for periodical cleaning of the atomiser has been completely eliminated in a number of installations. The Kestner patent film drier has also been utilised for a number of products for which this machine has not been used hitherto. It has been confirmed that the special arrangements for feeding the liquor to the drying drum, which form the subject of one of the patents under which this machine is manufactured, so effectively reduces the time during which the product is subjected to heat, that very sensitive products can be dried on this machine, even on the non-vacuum type.

Filtration Problems

Two distinct types of rotary vacuum filters—the Oliver drum filter and the Oliver disc filter—have been developed by Oliver United Filters, Ltd., of London. Both of these units are supplied in different sizes and types to meet varying requirements; the materials used in construction are also



The Sweetland Pressure Filter. (Oliver United Filters, Ltd.)

varied according to whether acid, alkaline or neutral liquids are to be handled. Filter areas range from three to seven hundred sq. ft. per unit in the drum type, and up to 2,000

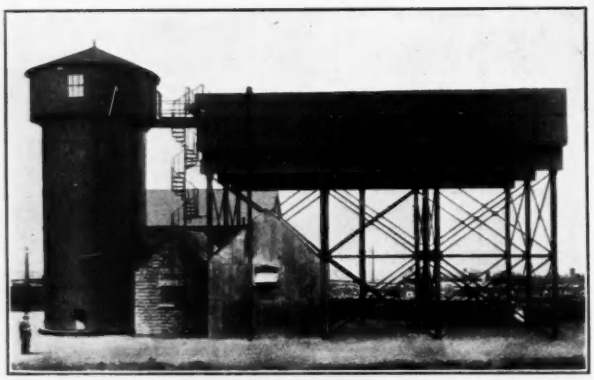
sq. ft. per unit in the disc type. The results obtained with these filters are remarkably good, even where the moisture content in the discharge salt is as low as 1.5 to 2 per cent. Such rotary filters are in successful operation dealing with ammonium nitrate, borax crystals, bicarbonate of soda, calcium arsenate, calcium sulphate, caustiser residues, lead sulphate, sodium nitrate, zinc sulphate and similar crystalline products. Generally speaking, vacuum filters are most successfully employed for the filtration and washing of products which contain a reasonably large percentage of free filtering suspended solids, especially when the filtration process is to be continuous and a minimum of attention is an important consideration.

For materials requiring filtration pressures higher than those obtainable under normal vacuum filtration conditions, Oliver United Filters, Ltd. have developed two distinct types of pressure filters. The Sweetland pressure filter, which is here illustrated, is suitable for working pressures up to 50 lb. per sq. inch. This filter was designed to overcome the limitations of the ordinary plate and frame press. In operation one man can control a battery of these filters, as cake discharge necessitates the breaking of only one joint, and actual discharge from the filter leaves is automatic. This type of filter also incorporates a closed circuit for the filtered liquid which, in many cases, is an important consideration. Filtration areas range from 2 to 1,000 sq. ft. per unit; cast iron, acid-resisting bronze, staybrite steel, and other materials can be used in construction. The Kelly filter may be operated at pressures up to 250 lb. per sq. inch. Its main difference in comparison with the Sweetland filter, apart from design, lies in the fact that in discharge operations the leaves are withdrawn from the body of the filter, whereas in the Sweetland the leaves of the filter remain stationary in the body.

Water Softening Plant

In connection with water softening for locomotives, the Paterson Engineering Co., Ltd., Windsor House, Kingsway, London, W.C.2, have recently secured an important contract from the L.M. & S. Railway Co., covering the installation of 16 large plants operating on lime and soda ash. They have also received contracts for lime and soda ash plants from the Sudan Government Railway and the Rhodesian Railways.

The 16 plants for the L. M. & S. Railway have an aggregate capacity of over 6,000,000 gallons per 24 hours and are to be situated at the following stations on the Midland and North-Western main lines, the capacity of each plant in gallons of softened water per hour being given in brackets:—Kenyon Junction (30,000); Whitmore (30,000); Hademore (20,000); Nuneaton (15,000); Northampton (15,000); Bletchley (12,000); Leighton Buzzard (4,000); Hellifield (8,000);



A Recent "Paterson" Water Softening Plant Operating on Lime and Soda Ash.

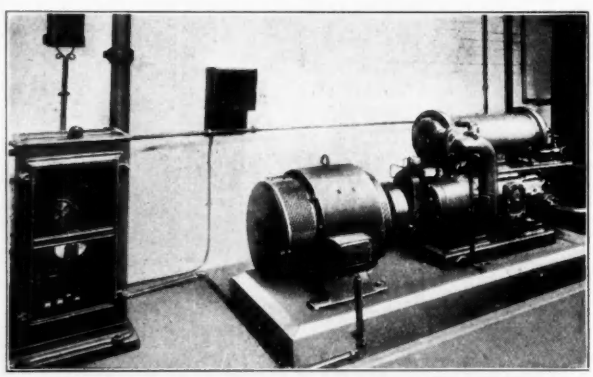
Toton (28,000); Melton Mowbray (20,000); Kettering (7,000); Wellingborough (17,000); Oakley (14,000); St. Albans (2,000); Cricklewood (16,000) and Kentish Town (16,000). The contract in each case is for a complete "Paterson" lime and soda ash water softener with vertical cylindrical mild steel plate reaction and precipitation tank, varying in height from 20 to 60 feet.

Here closed pressure sand filters are to be used for the removal of the last traces of suspended material from the softened water, avoiding self-contained wood wool filters and giving a clear product equal to town supply. There will also be a sludge de-watering plant. Other notable features are that the complete control of the plant, as well as of the mixing of the lime and soda ash reagents, is carried out at the ground level, special pumps being provided to deliver the reagents to the top of the plant. In each case also the reaction tank is very large, allowing a period of four, five or six hours for settling according to the requirements of each case. For sludge disposal a new method is embodied according to which the material is concentrated into a more or less thick mass, drawn off at intervals and passed to filter presses, being recovered in the form of almost dry cakes. These cakes are easily handled for carriage to waste land, constituting a notable improvement on the usual methods of sludge disposal in the bulky wet or semi-liquid form.

For filtration purposes the standard "Paterson" closed pressure sand filters are being used, with compressed air cleaning, operating at the rate of 120 gallons per square foot per hour. Some of these filters will be of the usual vertical construction with dished top and bottom up to 9 ft. diameter, but in other cases it is more convenient to use horizontal filters, 8 ft. diameter and 8-16ft. long, according to the output and the installation constitutes an example of the most modern scientific principles in water softening. In the field of the firm's "Chloronome" also for water sterilisation with a measured trace of chlorine gas, one of the latest installations is at the new Clarence Dock Power Station, Liverpool.

Compressed Air in Chemical Works

The use of compressed air in the chemical industries necessitates a consideration of many varying and sometimes opposing conditions. For instance, large volumes of air are sometimes required for short periods, in which case, the initial cost of the installation must be a deciding factor in the choice of plant. In other cases, air supply is required for continuous



Two-Stage Compressor, arranged for automatic electric starting. (Rotary Air Compressor Co., Ltd.)

process work, so that reliability becomes the all-important factor, coupled with economy in operation.

Rotary compressors have been considerably developed by the Rotary Air Compressor Co., Ltd., 12 Victoria Street, London, S.W.1, and have proved to be reliable units for continuous operation.

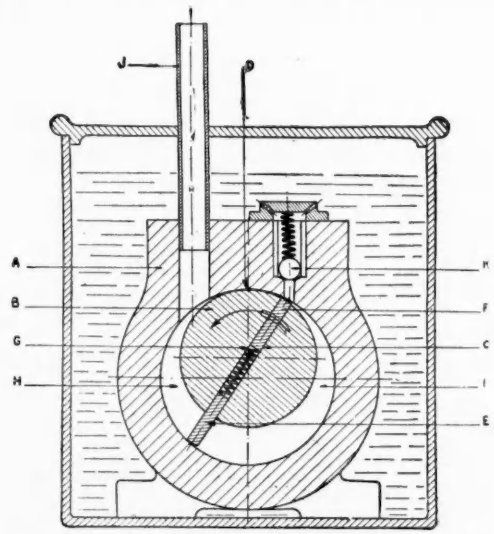
Where a large volume of air is required at a reasonable pressure, they also offer advantages over the reciprocating types of machines. They are simple in design, run at speeds suitable for direct coupling to standard motors, require very little attention, and instances are on record where such machines have run continuously night and day for several years without being opened up for inspection, and such a feature is of considerable interest in all industrial plants. They are also suitable for dealing with gases, in which case special glands are fitted, and the unloader is totally enclosed.

Single-stage machines can be offered for pressures up to 70 lb. per square inch, and two-stage machines up to 150 lb. per square inch. The two-stage arrangement can be made so that the two stages can operate in parallel until a certain

pressure is reached, and for final increase in the pressure to the desired figure, the two stages then can be changed over to operate in series, either by hand or automatically, effecting considerable saving in time, particularly when used as a vacuum pump, exhausting chambers of large capacity. The vacuum obtained by single-stage machines is not less than 95 per cent. of the barometer, and in two-stage machines 99.5 per cent. The accompanying illustration shows a typical two-stage compressor, motor-driven, arranged for automatic electric starting, without unloader.

Pumps for High Vacua

DURING the past year W. Edwards and Co., of Allendale Road, Denmark Hill, London, S.E.5., have introduced a number of new high speed pumps giving exceptionally high vacua, making possible the simplification and speeding up of manufacturing processes. Their well known "A" and "B" type pumps are in constant use in factories all over the country. The new single stage A2 and A3 pumps have free air capacities of 300 and 450 litres respectively, as against 85 for the type "A" and give vacua as low as 0.01 mm., as against 0.02 for the type "A," thus combining very



WORKING PRINCIPLES OF ROTARY VACUUM PUMP.
(W. EDWARDS & CO.)

much increased capacity with a vacuum increased to the extent of 50 per cent. The "Hyvac" series of pumps also supplied by this firm are widely used and the latest addition is the "Hypervac" pump which has a capacity of 210 litres per minute and gives a vacuum of 0.00005 mm. In order to reach the highest possible vacuum mercury vapour pumps of various capacities are supplied; where mercury is undesirable, oil diffusion pumps can be used. Edward's vacuum pipe line installation, which is in use at a number of works, has been still further perfected, and manufacturing operations for pumps have been so improved that the firm are now in a position to supply most vacuum pumps from stock. The number of repeat orders received prove that these pumps are invariably giving satisfaction to users.

Refinements in General Chemical Plant

APART from numerous separate items, W. J. Fraser & Co., Ltd., of Dagenham, Essex, have installed during the past year a number of complete plants for the chemical industry. These include such divers types as installations for mineral oil work, solvent recovery units, plant for the manufacture of tar compounds, rectification equipment, etc. In addition to these complete installations, batteries of steam and oil heated vessels have also been supplied to meet the requirements of various chemical processes. An interesting contract was for the manufacture of a number of steam jacketed vessels in which efficient stirring and scraping was an important consideration.

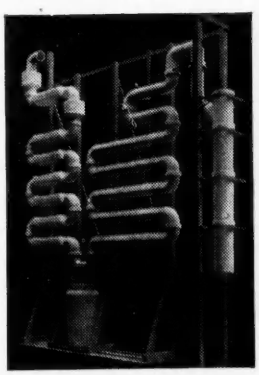
W. J. Fraser & Co., Ltd., were among the earliest manufacturers in this country of stainless steel vessels for the food and chemical industries, and equipment in this material has now become an important section of their regular output. Particular attention has been devoted to the design and manufacture of pressure vessels in stainless steel, and here the firm's experience has been of considerable service to the customers with whom they have co-operated. An interesting phase in the year's work has been the fabrication of welded and riveted vessels for duty under very high vacua, and the successful results obtained from this special plant after installation may be taken as an example justifying the great care given to design, workmanship and materials.

Improvement in Acid Resisting Iron

MUCH attention has been given in recent years to the development and perfection of "Ironac" metal, the well known ferro-silicon acid-resisting alloy produced by the Haughton's Patent Metallic Packing Co., Ltd., of 30 St. Mary-at-Hill, London, E.C.3. For many years the outstanding advantages of this form of acid-resisting iron have been apparent to the chemical industry, and its use has met with great success for the purposes of resisting sulphuric and nitric acid of all densities. The alloy is rich in silicon and one of the earlier difficulties with which the producers had to contend was its undue brittleness; but thanks to continued research and improved methods of manipulation, this difficulty to a very great extent has been overcome. Suitable heat-treatment methods are now adopted in producing Ironac, so as to render it a most valuable acid-resisting alloy for use in the heavy chemical industry. During the past year some improved installations in the way of acid-resisting tower plant for dealing with the rectification of waste acids have been completed, as well as a pipe line equipment for both sulphuric and nitric acids in connection with explosives undertakings. It has been found that Ironac metal has proved a great success for this application, particularly in cases where extreme corrosion had to be faced, and where in the ordinary way, even ceramic materials would be unsuitable owing to the high temperatures of the waste acids dealt with. A further development recently attained with Ironac metal has been that castings of larger size are now being made than formerly, due to improved foundry conditions. In connection with the development of Ironac metal for pipe line equipment, improvements have also been made in acid-resisting taps and valves.

Vitreosil Chemical Plant

THE keen manufacturing competition which exists to-day makes the adoption of up-to-date methods and the installation of up-to-date plant imperative if commercial success is to be attained. It is therefore of special interest to the chemical industry to note the latest improvements in design and construction of Vitreosil (pure fused quartz or silica) plants for the manufacture of nitric, hydrochloric, sulphuric and other acids. This remarkable material is manufactured exclusively by the Thermal Syndicate, Ltd., whose offices and works were first established at Wallsend-on-Tyne over quarter of a century ago. A special form of absorption vessel, of high efficiency has been designed by this firm, which not only gives excellent results in practice, but obviates the necessity for submerged joints, which invariably constitute a weak point in any plant. A 2½ ton Vitreosil plant of latest design for the manufacture of synthetic hydrochloric acid, in which a column of the above adsorption vessels is included, is here illustrated. Plants of this design effect economy of ground space and increased efficiency, whilst the general arrangement can now be modified to suit local requirements. Great progress has recently been made in the manufacture of Vitreosil, and containers or reaction vessels of large sizes, up to 114 gallons, are now available.



(*Continued on page* 110)

News from the Allied Industries

Tanning

AN OUTBREAK OF FIRE occurred last week at the premises of W. and J. Sagar, Ltd., Ball Grove Leather Works, Colne, Lancs. The portion affected was one of the main buildings, consisting of five storeys, the employees in which—numbering between 100 and 150—had just returned from breakfast when the outbreak was discovered. It was only through strenuous efforts on the part of the brigade that the fire was confined to the four top floors of the building, which were seriously damaged.

OIL EXTRACTED FROM BIRCH is being used to give Russian leather an agreeable scent. The preparation of Russian leather may consist of a first treatment with a sour rye paste, followed by tanning with a decoction of alder bark and dyeing red with sandalwood. To complete the operation, the skin is curried with birch empyreumatic oil, which communicates its particular properties to Russia leather. This oil may be obtained by the distillation of birch bark in copper alambics.

Cement Manufacture

OPERATIONS HAVE BEEN STARTED at a new Portland cement plant at Hällekis, in southern Sweden. The plant, which belongs to the Skaanska Cement Co., is built for an annual production of 500,000 barrels. Only a single rotary furnace has been installed, which is, however, the largest cement furnace in Sweden, being 94 metres in length. The other plant machinery is also of extraordinarily large dimensions. The total construction cost of the plant amounts to approximately 3.5 million kroner. Cement production, on the whole, is strongly developed in the Scandinavian countries, where there is a considerable surplus for exportation.

Paint and Varnish

SOME OF THE MOST PROMINENT FINANCIERS in America are promoting a new industry in Florida, namely the manufacture of tung oil. It has been clearly demonstrated that certain parts of Florida have climate and soil which is adapted to the growth of the tung oil tree. The company, which was formed last year to inaugurate the new industry has planted over 500,000 trees, and from this nursery trees are being sold to growers who are planting on a smaller scale than the large plantations, but who, when in production, will sell their output of nuts to the company's mills. The company recently opened its chemical laboratory in Polk City. Tung oil is used in the making of paint and varnish, and for the production of aluminium tungate employed as a waterproofing material.

Fertilisers

EXPERIMENTAL PRODUCTION by the Wintershall potash interests of its three-phase process for the manufacture of potassium nitrate and ammonium phosphate has been abandoned temporarily. This does not affect the commercial manufacture of potassium nitrate and ammonium chloride at the Sonderhausen plant where potassium chloride is treated with nitric acid for a yield of potassium nitrate and by-product hydrochloric acid which latter serves as a starting point for the manufacture of ammonium chloride. The Rauxel plant of the Wintershall-Kloeckner interests which operates a Claude ammonia synthesis is producing nitric acid, potassium ammonium nitrate, ammonium nitrate and ammonium sulphate-nitrate.

THE NEW ZEALAND GOVERNMENT has provided a subsidy of £100,000 to enable farmers to purchase fertilisers at a reduced price. The Government's contribution is in the form of a reduction in the price of £1 a ton on Nauru phosphate rock. It is estimated that this will represent a reduction of 11s. on the cost of a ton of superphosphate. Manufacturers and distributors of superphosphate have contributed a further reduction of 6s. 6d., making a total concession to the farmer of 17s. 6d. a ton. The sales price of superphosphate, which became effective October 2, is £3 17s. 6d. per ton at point of production. It is expected that the new quotations will immediately stimulate the demand for fertilisers, sales of which declined 30 to 35 per cent. during the last year. Superphosphate is used principally in New Zealand for top dressing of pastures.

Paper Making

DURING THE PAST SIX MONTHS a new plant has been operated in Rosario, Argentina, for the production of cellulose paper and the by-products, caustic soda and hydrochloric acid. A ready market has been developed for the by-products now produced at the rate of 50 metric tons of salt, 10 tons liquid caustic soda, and 5 tons of muriatic acid per day.

Pottery Trades

MAJOR B. J. MOORE has been appointed general works manager of Mintons, Ltd., at Stoke-on-Trent, where he will succeed Mr. H. Minton-Senhouse, who has held the position for more than twenty years and has left the Potteries for domestic reasons. Major Moore formerly held the position of manager at the factory of Josiah Wedgwood and Sons, Etruria, and at the Royal Worcester Porcelain Works.

Liquid Fuels

FOREIGN OIL INTERESTS have been disturbed by the announcement of a proposal to establish a "standard motor fuel" in Germany. Representatives of the foreign undertakings affected recently met in Hamburg, and again in Berlin on the succeeding day, to discuss the possibilities of counter measures. The proposal emanates from a Government Commission, and although the Commission has not yet drafted its final proposals, it is stated that something in the nature of a monopoly is proposed with a system of import licences. It is estimated that the Standard Oil and Shell Group have about £7,500,000 in the German industry, the Anglo-Persian £2,500,000, and the Russians £1,250,000. The Benzole Union has also expended some £2,500,000 and the gasoline undertaking associated very closely with the I. G. Farbenindustrie close upon £750,000.

Iron and Steel

THE WEEKLY IRON MARKET at Birmingham attracted only a small number of traders. Conflicting reports were forthcoming as to current business. Taking the broader trade movements, there is little enough to substantiate optimism. Such improvements as are discerned are, it is to be feared, less significant than they appear. A discouraging feature is the wavering of demand for pig-iron by the light castings trade. For several months this demand has been the main strength of the blast-furnacemen's position, for the heavy engineering foundries and the forges have been relatively inactive. The reaction at the light foundries is now becoming evident. It is attributed largely to the postponement of development and other schemes in the name of economy, and the check which private enterprise has sustained through heavy taxation.

Glass Trade

TWO REPRESENTATIVES FROM A CZECHO-SLOVAKIAN FIRM of pressed glass manufacturers, who are reputed to be the largest dealers in pressed glass in Central Europe, recently interviewed the Mayor of St. Helens with a view to securing a site at St. Helens for building a factory. The visitors had a long interview with the Mayor and were afterwards conducted round the town by Councillor Thomas Wood, when various sites were inspected.

IN THE CHANCERY DIVISION, on Thursday, January 21, Mr. Justice Luxmoore gave judgment in an action which began in March last and ended on May 7, brought by the British Hartford-Fairmount Syndicate, Ltd., against Jackson Bros. (Knottingley), Ltd., Headlands Glassworks, Knottingley, for an injunction restraining infringement of their patent for improvements in the method of feeding molten glass to bottle-making machines. In support of their claim of invalidity, the defendant company contended that the invention was not novel, or useful, because of prior publication and prior common general knowledge. His Lordship also held that the patent was anticipated by patents granted in this country and in the United States. On the ground that the patent was invalid, the action was dismissed with costs.

From Week to Week

SIR GOWLAND HOPKINS, first Cambridge Professor of Biochemistry, broadcast the first national lecture of the year on January 22, on "Vitamins as Necessities of Life."

TWO ZINC DISTILLATION FURNACES which have been idle at Avonmouth, near Bristol, since July last are about to be restarted. Employment will be provided for about seventy men.

UNIVERSITY TITLES conferred by the Senate of the University of London this week include the name of Dr. Robert Robison (Lister Institute of Preventive Medicine) as professor of bio-chemistry. Mr. Albert Rushton of Manchester University has been appointed Reader in general chemical technology.

THE TELEPHONE NUMBER of Ivor R. Jones, Atlantic Chambers, Brazennose Street, Manchester, is Blackfriars (Manchester) 4558, not "5845" as shown in the telephone numbers section of The Chemical Age Year Book, 1932. Users of the Year Book should make a note of the correction.

RECENT WILLS include:—Mr. William Foulkes Lowe, F.I.C., city analyst for Chester and the counties of Denbigh, Flint, Carnarvon and Anglesey, £5,100 (net personalty £5,050). Mr. Henry Hyman Haldine, K.C., J.P., London, chairman of St. Helens Petroleum Co., Ltd., and a director of other oil companies, £56,753.

A CONFERENCE ON "SAFETY IN MINES," representative of all those engaged in the coal mining industry in the counties of Derby, Leicester, and Nottingham, is to be held, under the chairmanship of Mr. Isaac Foot, at Nottingham, on February 6. Addresses are to be given by Sir Henry Walker, Mr. J. R. Felton, Professor R. V. Wheeler and Major H. M. Hudspeth.

A LARGE EXTENSION OF THE WORKS of British Bemberg, Ltd., which has an artificial silk factory at Doncaster, may be undertaken in the near future. It is understood that one of the Bemberg factories in Germany is to be closed down and the machinery and heads of the technical staff will be transferred to Doncaster.

DR. A. C. MONKHOUSE gave a lecture on "The Recovery of Phenols in the Rhur District" at a meeting of the Bristol and South Western Counties Section of the Institute of Chemistry at Bristol University on Monday. An account was given of investigations carried out in Germany over a period of two years into the most efficient method of recovering the phenol from the effluents from gas and coke oven plants, thereby reducing the pollution of rivers and waterways.

SIR ERIC HAMBRO, who announced last month that he was providing the initial funds to develop the Salerni low temperature carbonisation system in this country, had to postpone his proposed tour of the coal mining centres owing to a severe attack of influenza. It has been decided to issue forthwith a paper by Commendatore Salerni giving a full description of the process and apparatus with diagrams and drawings in order that fuel technologists and engineers may be in a position to form an exact opinion of the value of the invention.

THE AGRICULTURAL RESEARCH COUNCIL, which acts under the direction of the Committee of the Privy Council for Agricultural Research, has decided that its first task must be to survey the present position of agricultural investigation in Great Britain, and has appointed committees to deal with animal diseases (chairman, Sir Merrik Burrell); animal nutrition (chairman, Sir Frederick Gowland Hopkins); dairying and animal products (chairman, Professor E. P. Cathcart); plant physiology and disease (chairman, Sir Daniel Hall); soils and plant nutrition (chairman, Sir Thomas Middleton), and agricultural economies (chairman, Mr. Joseph F. Duncan).

CASES OF POISONING, anthrax, and epitheliomatous and chrome ulceration in Great Britain and Northern Ireland reported during December, 1931, under the Factory and Workshop Act, or under the Lead Paint (Protection against Poisoning) Act, numbered 50; the total number of deaths reported was 11. There was one case due to aniline poisoning, five cases of chrome ulceration derived from chromium plating operations, and one case of lead poisoning at paint and colour works. Cases of ulceration due to pitch, tar and oil totalled 24.

THE EXPORTS FROM PLYMOUTH DOCKS during the year 1931 show a decrease of 6,467 tons, which is attributed by the G.W.R. Co. to the falling off in the shipment of china clay.

A SMOKING CONCERT will be held by the British Association of Chemists, London Section, at the Broad Street Station Restaurant, Broad Street, on Friday next, February 5. Members and friends, including non-members, will be cordially welcomed.

MR. THOMAS HARDING BOARD has been elected to the board of the United Molasses Co., Ltd., in place of Mr. William Henry Ross, who recently resigned his directorship for reasons of health. Mr. Board is also a director of the Distillers Co., Ltd.

ACCORDING TO INFORMATION from Moscow radium has been successfully won from Russian raw materials in tests carried out by the Union of Rare Metals Industry. The Soviet Government has granted a sum of 50,000 roubles for further research work.

DR. A. E. DUNSTAN, of the Anglo-Persian Oil Co., gave a lecture to the Liverpool Section of the Society of Chemical Industry at the University, on Friday, January 22, his subject being "Liquid Fuels of To-day and To-morrow." Previously, members of the Society had visited the British Petroleum Co's oil installation at Ellesmere Port.

DR. GADIENT ENGI, vice president and managing director of the Society of Chemical Industry in Basle and President of the Swiss Society of Chemical Industry, has been awarded the degree of doctor *honoris causa* by the University of Basle, in acknowledgement of the great services he rendered in the field of organic chemistry and the chemistry of dyestuffs.

THE PASS LIST of the January examinations of the Institute of Chemistry comprises the following: Examination in general chemistry for the Associateship—W. F. Bews (Liverpool Central Technical School), D. H. Lloyd (Birmingham Technical School) and R. D. Mason (Birbeck College, London); examination for the Fellowship in branch B (physical chemistry, with special reference to electro-chemistry)—A. B. Winterbottom (Manchester).

THE TWELFTH ANNUAL MEETING of the Research Association of British Rubber Manufacturers will be held at the First Avenue Hotel, High Holborn, on Tuesday next, February 2. There will be a luncheon in connection with the meeting, at which Sir Frank Smith, secretary of the Department of Scientific and Industrial Research, will respond to the toast of the guests, and Sir Robert Robertson, Government Chemist, will propose the toast of the Association.

MR. R. H. DAVIS, governing director of Siebe, Gorman and Co., Ltd., who, as reported in THE CHEMICAL AGE of June 13 last, is the inventor of the famous "Davis" submarine escape apparatus, was presented with a table lamp on January 23, in celebration of his completion of fifty years' service with the company. We are asked to contradict a report published in a Sunday newspaper that Mr. Davis is retiring. On the contrary, he hopes to continue active service for many years.

FIVE MEN WERE INJURED at the North British Rubber Works, Edinburgh, on Friday, January 22, when an explosion occurred in the curing department. The men were John Stewart, and Thomas Halliday, both of whom had head injuries and were unconscious when admitted to hospital; Duncan Fraser, James McKinnon and Thomas O'Brien. Fraser was the only one in the curing department when the explosion occurred. The others were about to begin work in the vulcanite department when fragments of a heater burst through the wall. About 4,000 workers are employed at the mills, but few were at work when the explosion occurred, as it was during the lunch hour.

Obituary

MR. WILLIAM WARNOCK MELLON, formerly joint managing director of Paul and Vincent, Ltd., chemical manure manufacturers, Dublin, at his residence at Blackrock, Dublin. Mr. Mellon retired from active work some years ago. At the funeral at Mount Johnstone Cemetery on January 22, the local section of the Institute of Chemistry was represented by Dr. A. G. G. Leonard, hon. secretary.

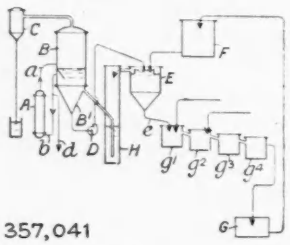
Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2. at 1s. each.

Abstracts of Accepted Specifications

357,041. PHOSPHORIC ACID. Künstdunger-Patent-Verwertungs Akt.-Ges., Glarus, Switzerland. International Convention date, January 29, 1930.

Phosphate rock is leached with acids and the dilute phosphoric acid freed from lime as calcium sulphate. The dilute acid is then evaporated and the dissolved calcium sulphate which separates is removed and returned to the leaching process. The weak acid circulates from a heater A to an evaporator B connected at the top to a condenser C. Most of the



357,041

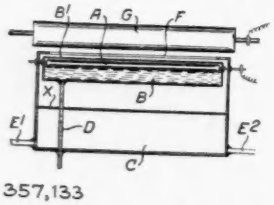
concentrated acid is drawn off at *d* and the precipitated calcium sulphate is withdrawn by a pump D to a settling tank E containing the dilute phosphoric acid. The deposited calcium sulphate and dilute acid pass to a series of reaction vessels g^1, g^2, g^3, g^4. Phosphate rock is added to g^1 and sulphuric acid to g^2, the reaction being completed in g^3, g^4. dilute phosphoric acid is separated in G and passes to a tank F, and thence to settling tank E from which it overflows to tank H.

357,125. METAL COMPOUNDS OF SYNTHETIC RESINS. Imperial Chemical Industries, Ltd., Millbank, London, and W. Baird, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, May 6, 1930.

A polyhydric-alcohol-polybasic-acid condensation product is treated with ammonia, aliphatic amines, alkali metal hydroxides or weak acid salts of alkali metals, and the product is treated with the solution of a salt of a metal other than an alkali metal, or with similar metal oxide, hydroxide, or salt of a weak acid. Examples are given of the treatment of the condensation product of glycerol and phthalic anhydride with ammonia and a solution of barium or calcium chloride; the condensation product of glycerol, phthalic anhydride and castor oil with ammonia and a solution of cobalt nitrate or copper sulphate; or the same condensation product may be dissolved in butyl alcohol and toluene, and treated with barium carbonate.

357,133. CARBON BLACK; FATTY ACIDS. Burmah Oil Co., Ltd., 175 West George Street, Glasgow, S. T. Minchin, and R. E. Downer, of Burmah Oil Co., Fairlawn, Honor Oak Road, Forest Hill, London. Application date, June 13, 1930.

Carbon black is deposited on an electrically charged conductor in the luminous flame of burning petroleum or other



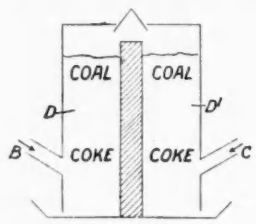
357,133

mineral oils, residues, distillates, or extracts obtained by liquid sulphur dioxide from mineral oils. The yield of carbon may be increased by maintaining it at a uniform temperature or by cooling it by rotation. Direct current may be used with two conductors inserted in the flame, or alternating current with one or more conductors near the zone of maximum brightness.

A rotating metal roller A covered with asbestos is provided in a reservoir B below a slot B^1, and is immersed in oil supplied by the pipe D. The reservoir B is mounted in a metal casing C below a slot F, and air is supplied by pipes E^1, E^2. The flame from the oil is a long flat one, and the two electrodes consist of reservoir B with roller A, and another slowly rotating hollow roller G which may be heated or cooled by the passage of gases or water. The carbon deposit is removed from roller G by a scraper.

357,178. SULPHUR. D. Tyrer, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Millbank, London. Application date, June 16, 1930.

Sulphur is produced from sulphur dioxide and low-temperature coke, by which a lower reaction temperature of 600°-800° C. is possible. If the temperature is raised to 1,000° C. an increased output is obtained. The reduced gases may be used to produce further quantities of semi-coke. The reduc-



357,178

tion is effected by passing the gas through a bed of semi-coke which may be heated externally, or by alternately passing air and gas through it, or a mixture of the air and gas may be passed through it. In an example, two retorts D, D^1 are filled with semi-coke with a charge of coal at the top, and air is admitted through the ports B, C to raise the temperature to 1,000° C. A mixture of air and gas containing sulphur oxide is blown through the port B, and the gases then pass through both layers of coal to the other port C. The coal is converted to semi-coke, and the tar is absorbed in the second layer of coke till the temperature falls to 800° C., when the flow of gas is reversed. Another example is given in which a single retort is used.

357,366. COBALT COMPOUNDS. E. A. A. Grönwall, 29 Klara Norra Kyrokogata, Stockholm. International Convention date, September 17, 1929.

Copper pyrites is roasted and melted to form a matte which is besemerised and the blowing continued until most of the cobalt sulphide has passed into the slag, which is then lixiviated with sulphuric acid and the cobalt compounds obtained by precipitation or crystallisation.

357,387. INHIBITING THE ACTION OF SULPHURIC ACID ON METALS. Imperial Chemical Industries, Millbank, London. International Convention date, October 9, 1929.

Dilute sulphuric acid used in pickling and cleaning processes is prevented from attacking metal by adding thioglycollic acid, thiodiglycollic acid, polythioglycollic acids, or their salts or esters.

357,396. AMMONIUM SULPHATE NITRATE. Gewerkschaft Victor, 2 Castrop-Rauxel, Westphalia, Germany. International Convention date, October 17, 1929.

Sulphuric acid and ammonia are introduced into ammonium nitrate solution and the heat of neutralisation is used for evaporating the water from the solution. The reaction is carried out under strongly alkaline conditions to avoid nitrogen losses, and the hot vapour is led directly into a rectifying column to obtain a concentrated ammoniacal liquor. The apparatus is described.

Applications for Patents

[*In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.*]

Atlantic Refining Co. Refining mineral oils. 1903. January 22. (United States, January 23, '31.)

Bell Bros. (Manchester, 1927), Ltd., and Benson, C. G. Apparatus for mixing solids with liquids. 1547. January 19.

Bunbury, H. M., Davies, J. S. H., Eccles, A., and Imperial Chemical Industries, Ltd. Manufacture of organic disulphides. 1871. January 21.

British Industrial Solvents, Ltd., and Langwell, H. Manufacture of organic condensation products. 1666. January 19.

—— and Langwell, H. Compositions for stripping paint, &c. 1867. January 21.

—— (*Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler*). Production of mesityl oxide &c. from acetone &c. 1920. January 21.

Carter, C., and Imperial Chemical Industries, Ltd. Manufacture of solid sodium hypochlorite preparations. 1923. January 21.

Chinoin Fabrik Chemisch-Pharmaceutischer Produkte Akt.-Ges., Dr. V. Kereszty and Dr. Wolf. Production of aluminium derivatives of acetyl-salicylic acid. 1786. January 20. (Hungary, April 15, '31.)

Coley, H. E., and Kekwick, L. O. Production of hydrocarbons. 1869. January 21.

Duckham, A., & Co., Ltd. Cleaning composition. 1824. January 21.

Du Pont de Nemours & Co., E. I. Manufacture of blasting-explosives &c. 2136. January 23. (United States, January 24, '31.)

Ewan, T., Imperial Chemical Industries, Ltd., and Standen, A. Manufacture of hydrocyanic acid gas. 2138. January 23.

Greenhalgh, R. Manufacture of diphenylolpropane. 1924. January 21.

Greenstreet, C. J. Distillation &c. of materials containing hydrocarbons. 1458. January 18.

Groves, W. W. (*I. G. Farbenindustrie Akt.-Ges.*). Manufacture of thio-derivatives. 1482. January 18.

Johnson, J. Y. (*I. G. Farbenindustrie Akt.-Ges.*). Manufacture of agents for combating plant pests. 1426. January 18.

—— Manufacture of thio-derivatives. 1482. January 18.

—— Manufacture of acetaldehyde from acetylene. 1751. January 20.

—— Manufacture of coloured masses and solutions thereof. 2118. January 23.

I. G. Farbenindustrie Akt.-Ges. Manufacture of styrene, &c. 1501. January 18. (Germany, January 17, '31.)

Imperial Chemical Industries, Ltd., Jones, M., and Naunton, W. J. S. Vulcanization of rubber. 1512. January 18.

—— Manufacture of diphenylolpropane. 1924. January 21.

—— and Young, K. W. Roasting pyrites &c. 2137. January 23.

International Hydrogenation Patents Co., Ltd. Treating hydrocarbons. 1940. January 22. (United States, February 2, '31.)

Rawstron, F. C., and Robinson Bros., Ltd. Manufacture of piperidine pentamethylene dithiocarbamate. 1794. January 20.

Still, C. Separation of phenols from coal tar &c. 1626. January 19. (Germany, January 19, '31.)

Youell, J. E. Manufacture of organic condensation products. 1666. January 19.

Index to British Standard Specifications

THE 1932 edition of the Index to British Standard Specifications has just been issued. It is a complete subject index which, in view of the large number of British Standard Specifications now available, some of which include provisions for several articles or materials, will be of much assistance to those purchasing engineering and allied material, apparatus and machinery. A numerical list of the specifications is also included. The indexed list, which covers 40 pages, shows the wide range of subjects covered by the British Standard Specifications and should be in the hands of all drawing offices and contracts departments of public authorities and firms throughout the engineering, building, chemical and allied industries who have found the British Standards of such benefit in the preparation of contracts and tenders. Copies are available from the Publications Department, British Standards Institution, 28 Victoria Street, London, S.W.1., price 1s. 2d. post free. To assist in the wider adoption of the British Standard Specifications, the Institution has again taken accommodation at the British Industries Fair, Birmingham (Stand 18 G 2) where copies will be available both for reference and sale.

The Institute of Chemical Engineers

Tenth Annual Corporate Meeting

THE programme for the tenth annual corporate meeting of the Institution of Chemical Engineers has just been issued. While this function is confined to one day only, there should be no lack of interest in the proceedings. The meeting, which is being held at the Hotel Victoria, Northumberland Avenue, London, W.C.2, on Friday, February 19, opens with the usual session for members only, at which formal business will be transacted. The meeting will be opened to the public at 12 noon, when the President, Mr. W. A. S. Calder, will give his address, the subject being "Control of Industry." In view of Mr. Calder's long and intimate connection with the chemical industry, an interesting and authoritative address may be anticipated.

After the adjournment for lunch, Dr. Ezer Griffiths, F.R.S., of the National Physical Laboratory, will present, at 2.15 p.m., a paper on "Thermal Insulation," in which he will deal with types of apparatus for thermal conductivity measurements, investigations into heat loss from a pipe surface in air, characteristics of some heat insulation materials and methods of estimating heat flow in complex structures.

In the evening, in the Grand Hall of the Hotel the annual dinner will be held, under the presidency of Mr. Calder. The principal speaker will be Sir Harry McGowan, Chairman of Imperial Chemical Industries, Ltd., and other speakers will include Lord Leverhulme (president-elect) and Sir John Cadman.

British Chemical Standards

International Developments

THE British Chemical Standards Movement held a meeting of co-operators at York on Saturday, January 23, at which a report on the fifth Three Years Working, viz., up to September 15, 1931, was presented. This body, though British in origin, is now international and produces standard analysed samples used all over the world, by means of which the reliability both of the analytical methods used for determining the composition of a large number of materials and of their correct working can be verified. Apart from the commercial advantages of the accurate control of the composition of large tonnages of materials—both ferrous and non-ferrous—a co-ordinating effect being exercised over many millions of tons, disputes and delays being largely saved, and benefits gained in many ways, another valuable result of this work is the constant investigation by the co-operators of the methods themselves, whereby any weaknesses are detected and eliminated. Outlines of the methods used by each chemist are published on the certificates issued with each sample.

The report showed that, notwithstanding the world-wide difficult business conditions, considerable progress had been made not only with the number and types of standards produced, but also of users. The meeting was well attended by co-operators from many parts of the country, whilst many regrets for inability to attend, both from this country and abroad, were received. Dr. J. T. Dunn was in the chair. Besides co-operators, there were present Mr. P. Good, deputy director of the British Standards Institution, and Mr. J. Davidson Pratt, general manager of the Association of British Chemical Manufacturers.

The Runcorn Chemical Works Accident

Some New Facts

FURTHER details are to hand with reference to the accident at the Wigg Works, Runcorn, of Imperial Chemical Industries, Ltd., reported in THE CHEMICAL AGE of January 16. The explosion, which resulted in the death of one man and the injury of two others, did not occur in the carbon bisulphide plant, but in the subliming chamber of the Chance-Claus sulphur kiln, which is used for the recovery of sulphur from the waste gases (sulphuretted hydrogen) of the carbon bisulphide plant. The explosion occurred about three minutes after the lid of the kiln was lifted. The two men, who were burnt about the face and hands, were not detained after treatment at the hospital.

Points from Manufacturers' Literature

The Editor welcomes copies of new brochures and leaflets describing plant, equipment and products of interest to chemical manufacturers and the chemical-using trades.

MICRO-CHEMICAL ANALYSIS demands rigid adherence to the prescribed technique and it is essential that the smallest details of each operation should be carried out with the greatest precision. Thus runs the introductory matter to a newly issued leaflet on micro-analytical reagents and organic reagents for spot tests, products of The British Drug Houses, Ltd., Graham Street, City Road, London, N.1. The methods employed in micro-chemical analysis differ considerably from the older classical methods of macro-analysis; the necessary mental outlook towards the new technique must be acquired as well as practical experience of the new manipulation. The special reagents characterised by the letters M.A.R. (Micro-Analytical Reagent) and bearing the B.D.H. trademark have been prepared in strict accordance with the directions laid down by Pregl and his collaborators, and they have been employed in actual micro-chemical determinations in order to prove their suitability for the work. The organic reagents for "spot" tests are available for use in the detection and determination of minute traces of a number of elements. The system whereby only single drops of solution are used for qualitative investigations has been developed by Feigl and others. The reactions are carried out in micro test-tubes, on microscope slides or by means of papers impregnated with various reagents. Short monographs describing the uses of a number of the reagents will be supplied on application.

* * *

METAL PLATE AND SHEET WORK in great variety is illustrated in a brochure recently issued by Fredk. Braby and Co., Ltd., 352-364 Euston Road, London, N.W.1. Among these illustrations we notice a cooling cylinder for ice-making plant, a washing tank for the cyanide treatment of metallurgical ores, gas holders and air receivers, bottle washing machines, high pressure cylinders 6 ft. diameter by 27 ft. long for working pressures up to 90 lb. per sq. in., storage tanks for inflammable liquids with capacities up to 500,000 gallons, welded wagon tanks, steel chimneys and flues, perforated metal screens and cylinders, hopper constructions and a variety of cylindrical tanks generally applicable for industrial work. This firm now has a factory at Bristol entirely devoted to the fabrication of aluminium goods chiefly for the food processing and canning industry. In this section of their manufactures they illustrate jacketed steam pans, portable tanks and pans carried on trolleys of steel tubular framework, and other items.

* * *

THERE ARE SOME INTERESTING FACTS to be gleaned from a study of the booklet on disintegrating and emulsifying mills supplied by Premier Colloid Mills, Ltd., 380 Salisbury House, London Wall, E.C.2. For instance, it is pointed out that when it is desired to get chemical reaction between two or more immiscible liquids, these liuqids can be broken down into such an extremely fine dispersion by passing them through the "Premier" mill that the area of contact surface is increased some thousandfold, and in consequence, the time of reaction is rendered almost negligible. If certain soft solids be suspended in liquid and passed through the mill, they become disintegrated to a fineness far beyond what one could obtain by any form of grinding. It is well known, of course, that in ordinary grinding beyond a certain limit, particles merely coalesce again, and in order to get beyond this limit it is necessary to make use of certain protective bodies which simply coat each particle with a thin film and prevent coalescing. Not every pigment will yield readily to the manufacture of enamels and printing inks, but in the case of the softer varieties, this type of mill is available whereby from 20-60 gallons of enamel or printing ink can be made per hour. It is only necessary to mix the oil or varnish with the pigment in a very rough manner and pass the whole of it through the mill in a continuous stream, when it will be found that all aggregates of pigment are broken down, and each and every particle becomes thoroughly saturated with oil or varnish. There is no wear or tear in the machine, and when the expense of keeping grinding rollers in condition is considered, this is a decided monetary saving.

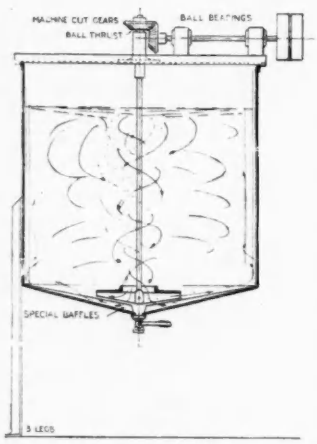
Indian Sugar Industry Reform

Proposals of the Bombay Council

PROPOSALS to revolutionise the sugar industry connected with the Bombay-Deccan irrigation country have been put forward by a committee of the Bombay Legislative Council, which, if adopted, would affect the entire Indian sugar industry. The Government money sunk in these lands, amounting to £7,500,000, is being felt as a heavy burden on the financial position, and the committee proposes that a better use, with a greater financial return, be made of the irrigated area. The scheme proposes to displace the present Indian sugar industry with a white sugar industry, as gur is at present a non-paying production. These proposals would make the erection of a string of sugar factories a possibility. Each factory would have about 6,000 acres of cane lands under its control, by this scheme, with a daily production of 300 tons of cane during the crushing season. The factories could be capitalised at a cost of £225,000 each.

A New Mixer for Semi-Viscous Liquids

W. ROWLANDSON & CO., of 75 Mark Lane, London, E.C.3, have specialised for a considerable time in the design of mixing machines covering the requirements of most trades. They have now developed a new type of liquid mixer which is capable of dealing with semi-viscous substances and have installed a model at their works for testing purposes. The principle of construction is shown in the accompanying illustration, the chief feature being the form of the agitator at the bottom of the mixing vessel. Problems for the use of this mixer will be welcomed. Their other specialities include grinding, sifting and filling machines, and hydraulic pumps and presses, and here again W. Rowlandson and Co. are willing to assist manufacturers in overcoming difficulties due to the nature of the products handled.



New Briquetting Process for Lignite

Development in Canada

A FULL-SCALE test of the new Morfit process for the briquetting of lignite was recently carried out at the plant of Western Dominion Collieries, Ltd., near Taylorton, Saskatchewan. This process has been evolved by Mr. C. C. Morfit, of Stuart, James and Cooke, New York, is expected to exert an important influence on the development of the Estevan lignite industry. The Company is stated to have spent more than $2,000,000 on development work in order to bring the plant to its present stage of production.

In this new process, the lignite coke coming from the carbonisers is mixed with the asphalt binder in the usual way, but an improvement to the Lürgi retorts has been devised. In the third and final stage of carbonisation a new method of cooling the coke is introduced, making it possible to store the product, either in coke or briquette form without danger of disintegration, crumbling or spontaneous combustion. In the carbonising process, the new plant reduces the moisture content of the lignite by approximately one-third, and increases the heat value, or calorific content, from 7,000 to about 13,000 B.Th. U., which is equal to the higher grade fuels.

Experiments are also being conducted at the plant with a view to the production of by-products. About 8 tons of tar are now being produced daily, and when distilled this yields a lignite pitch, which can be used for binding material for the briquettes. Further distillation produces a clear tar, and, still further, a crude carbolic acid. Another prospect, it is stated, is a light oil, which may be obtained by "washing" the gas and this can also be broken up into several component parts such as benzine and ammonia.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID, ACETIC, 40% TECH.—£19 15s. per ton d/d address U.K. in casks.
ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.
ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.
ACID NITRIC, 80° TW.—Spot, £20 to £25 per ton makers' works, according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.
AMMONIUM BICHROMATE.—8d. per lb., d/d U.K.
BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
BLEACHING POWDER, 35/37%.—Spot, £8 15s. per ton d/d station in casks, special terms for contracts.
BORAX, COMMERCIAL.—Granulated, £15 10s. per ton; powder, £17 per ton. (Packed in 1 cwt. bags, carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)
CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £5 5s. to £5 15s. per ton d/d station in drums.
CHROMIUM OXIDE.—10d. to 10½d. per lb. according to quantity d/d U.K.
CHROMETAN.—Crystals, 3¾d. per lb. Liquor, £19 10s. per ton d/d U.K.
METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 8d. to 2s. 3d. per gall.; pyridinised industrial, 1s. 10d. to 2s. 5d. per gall.; mineralised, 2s. 9d. to 3s. 3d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—5d. per lb. net d/d U.K., discount according to quantity; ground 5¾d. per lb.
POTASSIUM CHLORATE.—3¾d. per lb. ex-wharf, London, in cwt. kegs.
POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.
SALAMMONIAC.—First lump, spot, £42 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
SALT CAKE, UNGROUND.—Spot, £3 15s. per ton d/d station in bulk.
SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
SODA CAUSTIC, SOLID, 76/77° E.—Spot, £14 10s. per ton, d/d station.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.
SODIUM BICHROMATE CRYSTALS, CAKE AND POWDER.—4d. per lb. net d/d U.K., discount according to quantity. Anhydrous 5d. per lb.
SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.
SODIUM CHLORATE.—2¾d. per lb.
SODIUM CHROMATE.—3⅝d. per lb. d/d U.K.
SODIUM NITRITE.—Spot, £19 to £22 per ton, d/d station in drums.
SODIUM PHOSPHATE.—£13 to £15 per ton, f.o.r. London, casks free.
SODIUM SILICATE, 140° TW.—Spot, £8 5s. per ton, d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.
SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 15s. per ton, d/d in drums. Crystals—Spot, £7 15s. per ton, d/d in casks.
SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton; d/d station in kegs. Commercial—Spot, £9 10s. per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5½d. to 6¼d. per lb. Crude 60's 1s. 4d. to 1s. 5d. per gall.
ACID CRESYLIC 99/100.—1s. 8d. to 1s. 9d. per gall. B.P., 2s. 6d. to 3s. per gall. Refined, 2s. to 2s. 2d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.
BENZOLE.—Prices at works: Crude, 7d. to 7½d. per gall.; Standard Motor, 1s. 2d. to 1s. 3d. per gall. 90%.—1s. 3d. to 1s. 4d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.
TOLUOLE.—90%, 2s. 4d. per gall. Pure, 2s. 6d. per gall.
XYLOL.—2s. per gall. Pure, 2s. 3d. per gall.
CREOSOTE.—Standard specification, for export, 4¾d. to 5d. net per gall. f.o.b.; for Home, 3¾d. per gall. d/d.
NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 5d. to 1s. 6d. per gall. Solvent, 90/190, 11d. to 1s. 2d. per gall.
NAPHTHALENE.—Purified Crystals, £11 10s. per ton, in bags.
PITCH.—Medium soft, 80s. to 85s. per ton, in bulk at makers' works.
PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 4s. to 4s. 6d. per gall. 90/180, 2s. to 2s. 6d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID, BENZOIC, B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.
ACID NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.
ACID SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.
BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL 34.5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 2d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
DINITROBENZENE.—8½d. per lb.
DINITROTOLUENE.—48/50° C., 8d. per lb.; 66/68° C., 8¾d. per lb.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—Spot, £75 per ton in 1 ton lots, d/d buyer's works.
α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 10d. per lb.
m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra, d/d buyers' works.
NITRONAPHTHALENE.—8½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb. 100% d/d buyer's works.
o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 9d. per lb., d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 6d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. per ton. Grey, £12 per ton. Liquor, 8d. to 9d. per gall.
ACETIC ACID, TECHNICAL, 40%.—£16 15s. to £17 15s. per ton.
ACETONE.—£63 to £65 per ton.
AMYL ACETATE, TECHNICAL.—90s. to 98s. per cwt.
CHARCOAL.—£6 10s. to £10 10s. per ton, according to grade and locality.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gall.
METHYL ACETONE, 40/50%.—£52 per ton.
RED LIQUOR.—16° Tw., 8½d. to 10d. per gall.
WOOD CREOSOTE.—1s. to 2s. 6d. per gall., unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gall. Solvent, 3s. 9d. to 4s. 9d. per gall.
WOOD TAR.—£2 10s. to £6 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Pharmaceutical and Photographic Chemicals

The following changes are reported in the markets for pharmaceutical and photographic chemicals:—

BROMIDES, B.P.:—
AMMONIUM.—1s. 8d. per lb.
POTASSIUM.—1s. 5d. per lb.
SODIUM.—1s. 7d. per lb.
CAFFEIN, PURE.—7s. 9d. to 8s. 3d. per lb.
CAFFEIN, CITRAS.—6s. to 6s. 3d. per lb.
HYPOPHOSPHITES:—
AMMONIUM.—6s. 10d. to 7s. 4d. per lb.
BARIUM.—3s. 5d. to 3s. 11d. per lb.
CALCIUM.—2s. 9d. to 3s. 2d. per lb.
IRON.—6s. 4d. to 6s. 10d. per lb.
MAGNESIUM.—4s. 7d. to 5s. 1d. per lb.
MANGANESE.—Granular, 5s. 1d. to 5s. 7d. per lb.; powder, 4s. 8d. to 5s. 2d. per lb.
POTASSIUM.—3s. to 3s. 5d. per lb.
SODIUM.—2s. 11d. to 3s. 4d. per lb.
LITHIUM IODIDE.—28s. 6d. per lb.
POTASS. PERMANGANATE.—8¾d. per lb.
SODIUM BENZOATE.—1s. 9d. to 1s. 11d. per lb.

Rubber Chemicals

There are no changes to report in the market prices of rubber chemicals which were quoted in THE CHEMICAL AGE of January 16.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, January 28, 1932.

THE chemical market has received quite a fair amount of inquiry during the current week with a firmer tendency noticeable in practically every section. There is also a greater volume of inquiry for export.

General Chemicals

ACETONE.—Continues to receive a satisfactory demand with the market ruling firm at £65 to £68 per ton.

ACID, ACETIC.—Regular business is being placed in this section with the product firm at £37 5s. to £39 5s. per ton for Technical 80% and £38 5s. to £40 5s. per ton for Pure 80%.

ACID, CITRIC.—In somewhat better demand with the market firm at about 1s. 2d. per lb., less 5%.

ACID, FORMIC.—There is a fair amount of inquiry with material for early delivery in rather short supply. The market is firm at about £51 to £52 per ton.

ACID, OXALIC.—Continues in active request with conditions firm at £50 per ton in casks and £51 10s. per ton in kegs.

ACID, TARTARIC.—Is rather higher at 1s. 2d. per lb., less 5% with an improving demand.

ALUMINA SULPHATE.—In steady request at £8 15s. to £9 10s. per ton.

ARSENIC.—Continues in fair demand with the market firm. Imported material is quoted at about £24 per ton c.i.f. main U.K. Ports with Cornish material unobtainable for early delivery and quoted nominal at £28 per ton.

BARIUM CHLORIDE.—A larger volume of inquiry is being received for this product with the market firm at about £11 10s. per ton.

CREAM OF TARTAR.—Conditions in this market are very firm with the price quoted at about 103s. 6d. per cwt. to 105s. per cwt. and tending to advance.

FORMALDEHYDE.—Is receiving a fair demand and is quoted firm at about £30 per ton.

LEAD ACETATE.—In somewhat better request with the market tending firmer at about £44 per ton.

LITHOPONE.—The market is receiving quite a fair amount of inquiry with the price firm at about £30 per ton.

POTASH BICHROMATE.—In good request at 5d. per lb.

POTASH CHLORATE.—Firm at £32 to £34 per ton with a steady demand.

POTASH PERMANGANATE.—Needle Crystals B.P.—In active request and firm at 8½d. per lb.

POTASH PRUSSIATE.—Continues to receive a good demand with the market firm at 8½d. per lb.

SODA ACETATE.—A larger volume of inquiry has been received with the product tending to become firmer at about £21 10s. per ton.

SODA BICHROMATE.—In active demand at 4d. per lb.

SODA CHLORATE.—Firmer at about £30 per ton with a tendency to advance.

SODA HYPOSULPHITE.—In active request with the market firm.

SODA NITRITE.—In steady request with the market firm at £20 to £21 per ton.

SODA PRUSSIATE.—In good demand at 5d. to 5¾d. per lb. according to quantity.

SODIUM SULPHIDE.—In good request at unchanged prices.

ZINC SULPHATE.—Steady at £12 per ton.

Coal Tar Products

THERE is no change to report in the coal tar products market, which remains quiet. Prices still hold firm, but are unaltered from last week.

MOTOR BENZOL.—Unchanged at about 1s. 4½d. to 1s. 5½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 1½d. to 1s. 2d. per gallon f.o.r.

HEAVY NAPHTHA.—Quoted at about 11d. to 1s. 0½d. per gallon, f.o.r.

CREOSOTE OIL.—Remains at about 3d. to 3½d. per gallon f.o.r. in the North, and at about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Quoted at about 1s. 6d. per gallon f.o.r. for the 98/100% quality, and at about 1s. 4d. per gallon for the Dark quality 95/97%.

NAPHTHALENES.—Are unchanged, at £3 to £3 10s. per ton for the firelighter quality, at £4 to £4 10s. per ton for the 74/76 quality, and at about £5 10s. to £6 per ton for the 76/78 quality.

PITCH.—Quoted at 67s. 6d. to 72s. 6d. per ton, f.o.b. East Coast port.

THE following additional market conditions are reported:—

CARBOLIC ACID.—Is a steady market and there is brisk inquiry. Prices are unchanged at previous levels quoted, viz., 5½d. to 6¼d. per lb. in bulk packing.

SALICYLATES.—In a general way the position is firm at unchanged prices. Heavy demands are seasonal ones, but are probably influenced to a substantial extent by the present epidemic.

METHYL SAL.—Is unchanged in price and is quoted to-day at 1s. 4½d. to 1s. 6½d. according to quantity.

SACCHARIN.—Is 43s. 6d. per lb. with the usual rebates on quantities.

VANILLIN.—Clove oil material is unchanged at 16s. to 18s. per lb. Material that is not guaranteed manufactured from Clove Oil being quoted at 14s. 3d. to 16s. 3d. per lb.

Latest Oil Prices

LONDON, January 27.—LINSEED OIL was firmer. Spot, ex mill, £16 15s.; February, £14 2s. 6d.; February-April, £14 10s.; May-August, £15 17s. 6d.; September-December, £17 2s. 6d., naked. RAPE OIL was quiet. Crude extracted, £29 10s.; technical refined, £31 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £20; refined common edible, £23, and deodorised, £25, naked, ex mill. TURPENTINE was steady. American, spot, 52s.; February-April, 52s. 9d. per cwt.

HULL.—LINSEED OIL.—Spot and January closed at £14 10s.; February-April at £14 17s. 6d.; May-August at £15 17s. 6d.; September-December at £17 per ton, naked. COTTON OIL.—Egyptian, crude, spot, £19 15s.; edible refined, spot, £21 15s.; technical, spot, £21 15s.; deodorised, £23 15s. per ton, naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £24 10s. per ton, naked. GROUNDNUT OIL.—Crushed/extracted, spot, £31 10s.; deodorised, £35 10s. per ton. SOYA OIL.—Crushed/extracted, spot, £20; deodorised, £23 10s. per ton. RAPE OIL.—Crushed/extracted, spot, £29 10s.; refined £31 10s. per ton. COD OIL, 16s. per cwt. CASTOR OIL.—Pharmacy, spot, 45s. 6d.; firsts, 40s. 6d.; seconds, 38s. 6d. per cwt.

Scottish Coal Tar Products

THERE is a continued export demand for coal tar pitch, but supplies are very short in this locality. Creosote oil is also commanding fair attention, but other products are mainly quiet.

CRESYLIC ACID.—Market remains quiet and stocks are accumulating. Pale, 99/100 per cent., 1s. 3½d. to 1s. 4½d. per gallon; pale, 97/99 per cent., 1s. 1½d. to 1s. 2½d. per gallon; dark, 97/99 per cent., 1s. 0½d. to 1s. 1½d. per gallon, all f.o.r. makers' works. High boiling acid is unchanged at 2s. 6d. to 3s. per gallon

CARBOLIC SIXTIES.—Value is steady at 1s. 7d. to 1s. 8d. per gallon f.o.r. in bulk, there being a ready outlet for available supplies.

CREOSOTE OIL.—Production is low and values are steady. Specification oils, 2¾d. to 3¼d. per gallon; washed oil, 3½d. to 3¾d. per gallon; gasworks ordinary, 3¾d. to 4d. per gallon; all f.o.r. makers' works in buyers' tanks.

COAL TAR PITCH.—Prompt supplies command 75s. to 77s. 6d. per ton ex works in the home market.

WATER WHITE PRODUCTS.—Business is stagnant and values are weak. Motor Benzole, 1s. 3½d. to 1s. 4½d. per gallon; 90/160 Solvent, 1s. 2½d. to 1s. 3½d. per gallon; and 90/190 Heavy Solvent, 1s. 0½d. to 1s. 1½d. per gallon; all in bulk ex works.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—During the past week the market has continued unchanged at £5 5s. per ton f.o.b. U.K. port in single bags. Although normally the market advances at this season of the year it is steady at the moment. This is no doubt due to the fact that supplies appear to be plentiful. *Home.*—The prices remain unchanged. It is understood that a number of merchants are now making purchases in order to have stocks available for the early Spring demand.

IMPORTED NITRATE OF SODA.—The price for this product remains unchanged. No sales are reported.

BRITISH NITRATE OF SODA.—There is nothing fresh to report concerning this product.

NITRO-CHALK.—Now that the consuming season is approaching it is reported that orders are reaching producers in large volume. The price of £7 5s. per ton remains in operation until the end of June.

South Wales By-Products

THERE is no change in South Wales by-product activities. Business in nearly all sections continues to be slow and unsatisfactory. The demand for pitch is still confined to small, prompt parcels, and there appears no prospect of an immediate expansion in the call. Stocks are in excess of demands, but there is no change in values. Road tar maintains its slightly better demand, with quotations steady around the 13s. mark per 40-gallon barrel. Refined tars have a steady, if moderate, call with values unchanged for coke oven and gasworks tar. Naphthas remain slow, solvent having a small, sporadic call, while heavy has practically no call. Motor benzol is a fairly bright feature, but creosote remains weak. Patent fuel and coke exports are unsatisfactory. Patent fuel prices are:— 19s. to 19s. 3d., ex-ship Cardiff; 18s. to 18s. 3d. ex-ship Swansea. Coke prices are: Best foundry, 32s. 6d. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 17s. to 18s.

Are Your Filters Ready for Trade Recovery

Efficient filtration is an essential stage in many processes. By efficient is implied :—

1. High rates of flow and long runs between cleaning.
2. A brilliant filtrate involving complete removal of suspended impurities.
3. The economical handling of the filters.

J. M. Celite Filter-aids render each of these desirable features easily obtainable.

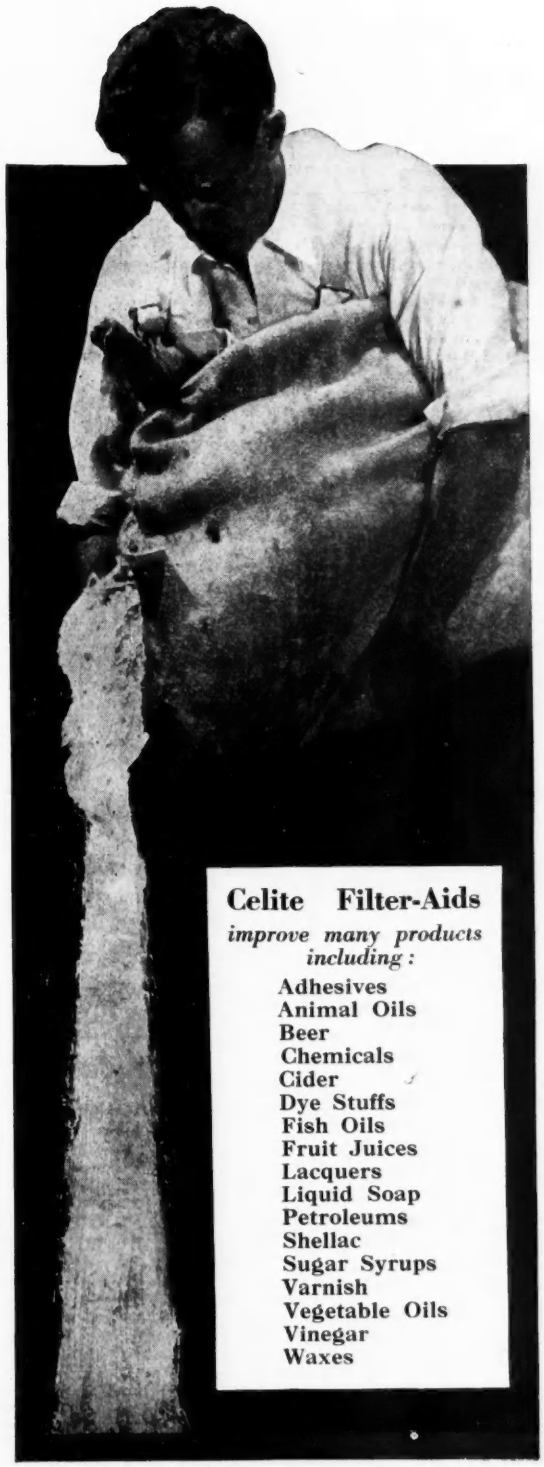
They are highly porous powders made from the highest quality diatomaceous silica obtainable. They are supplied as Hyflo Supercel, Standard Supercel and Filtercel.

The powder is added to the dirty liquid and becomes mingled with the impurities, so that when the mixture is passed through the filter the deposit on the filter cloth builds up as a porous and free filtering cake instead of a slimy impervious film.

Progressive manufacturers are preparing their plants for a recovery in trade and should not overlook such a practical and established means of improving their products and lowering their costs of production.

DO NOT WAIT—BE PREPARED.

Write now for further pertinent details and literature.



Johns-Manville

JOHNS-MANVILLE JM PRODUCTS

CELITE FILTER - AIDS

Hyflo Supercel, Supercel, Filtercel

JOHNS - MANVILLE CO., LTD.

Windsor House, Victoria Street, London, S.W.1.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Chas. Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, January 27, 1932.

THERE has been renewed activity in the Scottish heavy chemical market during the past week.

ACETONE.—Quoted £66 to £68 per ton ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £48 to £59 per ton; pure, 80%, £38 5s. per ton; technical, 80%, £37 5s. delivered buyer's premises Great Britain.

ACID, BORIC.—Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s. per ton; B.P. powder, £36 10s. per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at £50 to £53 per ton, ex store.

ACID, SULPHURIC.—£3 12s. 6d. per ton, ex works, for 144° quality. £7 per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS—Quoted 1s. 1¼d. to 1s. 1½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted £8 to £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted at £9 per ton, ex store.

AMMONIA ANHYDROUS.—Quoted 10d. to 1s. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—British dog tooth crystals quoted round £32 to £35 per ton, carriage paid according to quantity.

ANTIMONY OXIDE.—Spot material obtainable at round about £30 per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £27 per ton, ex wharf. Spot material still on offer at £28 10s. per ton, ex store.

BARIUM CHLORIDE.—Price about £11 5s. per ton in casks, ex store.

BLEACHING POWDER.—British manufacturers' contract price to consumers £8 15s. per ton, in 5s. 6d. cwt. casks.

CALCIUM CHLORIDE.—British manufacturers' price, £5 5s. to £5 15s. per ton, according to quantity and point of delivery.

COPPERAS, GREEN—At about £3 15s. per ton, f.o.r. or ex works.

FORMALDEHYDE, 40%.—Now quoted £28 per ton, ex store.

GLAUBER SALTS.—English material quoted £3 15s. per ton, ex station.

LEAD, RED.—Price now £30 per ton, delivered buyer's works.

LEAD, WHITE.—Quoted £40 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £42 to £44 per ton c.i.f. U.K. ports. Brown on offer at about £1 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p., quoted 1s. 8d. to 2s. 3d. per gallon.

POTASSIUM BICHROMATE.—Quoted 5d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—96% to 98%. In good demand. Spot material on offer, £28 per ton ex store.

POTASSIUM CHLORATE.—99¾/100% Powder.—Quoted £34 per ton ex store.

POTASSIUM NITRATE.—Refined granulated quality quoted £24 10s. per ton, c.i.f. U.K. ports. Spot material on offer at about £25 per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 7d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 8d. per lb., ex store.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77%, £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-toun lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station.

SODIUM BICHROMATE.—Quoted 4d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 5s. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, four-ton lots.

SODIUM PRUSSIATE.—Quoted 5d. to 5¾d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE).—Price, 65s. per ton, delivered, for ground quality.

SODIUM SULPHIDE.—Prices for home consumption: solid 60/62%, £10 5s. per ton; broken, 60/62%, £11 5s. per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyer's works on contract, minimum four-ton lots. Spot material, solid, 5s. per ton extra; crystals, 2s. 6d. per ton extra.

SULPHUR.—Flowers, £12 10s. per ton; roll, £12 10s. per ton; rock, £9 per ton; ground American, £10 per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Chemical Plant and Engineering

(Continued from page 101)

Modern Drying Plant

THE firm of L. A. Mitchell, Ltd., of Harvester House, 37 Peter Street, Manchester, specialise in drying plants suitable for either large or small outputs, and installations are in operation which have a drying capacity of 30 tons per day, and evaporate up to 22½ tons (50,000 lb.) of water per day, from the wet material. The latest designs ensure the most rapid, uniform and economic drying; they can be operated at any temperature from room temperature upwards. Such dryers are built on the unit system, and are so designed that they can be easily extended to meet increased demands. On the other hand, these dryers can be operated on half output without loss of efficiency, or increased fuel consumption per lb. of dried material. They also supply mechanical crystallisers, acid pumps, acid-proof stoneware, continuous rotary filters with combined dryers, complete chemical plants for the manufacture of lithopone, carbon bisulphide, zinc oxide, sulphuric acid, bichromates, caustic soda, hydrochloric acid and chlorines.

De-Watering Thick Pulps

TWO new developments are announced by Mining and Industrial Equipment, Ltd., 11 Southampton Row, London, W.C.1. The first is a new "Grit" pump for handling abrasive materials, thick pulps, etc. This pump has been developed in connection with the Andrews classifier. All parts that come in contact with the material being pumped are protected against wear. Gland troubles are eliminated by the special vanes on the back of the impeller, causing an outward centrifugal force which keeps all material away from the stuffing box. The pump is easily accessible for renewals and no special tools are required. The Andrews de-slimer is specially designed for dealing with preliminary classification, washing, de-watering and similar problems. The special teetering action obtained in this plant gives a particularly clean product free from fines. The Sandgate mechanism, which controls the discharge, ensure that the discharge is regulated automatically to agree with the input. This mechanism is simple, reliable and robust, and only consumes about ¼ h.p. If for any reason the feed falls off to half, or alternatively, increases to twice its normal amount, the output automatically varies accordingly.

Unchokeable Pumps for Solids

THE Blackstone "unchokeable" pump, supplied by Blackstone and Co., Ltd., of Stamford, is fitted with an impeller having large clearances, and this important point in construction will be very noticeable in the set which will be seen in operation. Vibrationless running is ensured at all speeds due to the special 2-ported impeller design, the ports being diametrically opposed. These pumps are specially constructed to meet the requirements of almost any pumping duty, and are built for stationary and portable use. Over 1,200 installations are now efficiently working to-day, pumping crude sewage, sludges, sand, gravel, clinker, ashes, trade effluents, fibres and such solids as have to be dealt with in excavation works, wells, coffer dams, gulleys, cesspools, sewage tanks, etc.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, January 27, 1932.

Recent reports of imminent tariff developments in respect of imported products generally have been received with interest in the chemical market, and the effect has been to make for increased firmness all round, especially, however, in connection with foreign materials. On this point, it is interesting to reflect that the 50 per cent. duty imposed last month on a restricted number of chemicals under the Abnormal Importations Act has not by any means so far affected quotations for the products in question to the full extent of the duty, although values have, to some extent, moved up. With regard to business during the past week, this has continued on moderate lines so far as fresh commitments are concerned, although from the point of view of contract deliveries there does not appear to have been any falling off in quantities moving into the textile finishing trades.

Heavy Chemicals

Sales of phosphate of soda this week have not been very extensive but prices keep up in the region of £13 to £14 per ton for the dibasic material. There is a moderate trade passing in the case of saltcake, offers of which are maintained at round £3 2s. 6d. per ton. Chlorate of soda meets with a quietly steady demand, and prices this week have been at up to £30 per ton. There is a fair demand about for bichromate of soda, which remains firm on the basis of 4d. per lb., less 1 to 3½ per cent., according to quantity, for January-March contract deliveries, and 4d. per lb. net for prompt sales. Prussiate of soda is unchanged on the week at from 5d. to 5½d. per lb., according to quantity, for crystals, with buying interest in the material only on moderate lines. Caustic soda is firm and fair contract deliveries are being made; contract values range from £12 15s. to £14 per ton, according to grade. With regard to hyposulphite of soda, prices are steady at from £9 to £9 5s. per ton for the commercial quality, and about £15 10s. for the photographic. The demand for sulphide of sodium continues on a relatively slow scale and prices in this section seem to be barely steady at round £11 per ton for the 60-62 per cent. concentrated solid quality and £8 10s. for the commercial. Alkali is reported to be moving in fairly steady quantities, principally against contracts, with offers very firm at round £6 per ton. A moderate business is passing in bicarbonate of soda, values of which are fully maintained at about £10 10s. per ton.

The potash materials are steady to firm generally, with the demand in most sections on quiet lines. Permanganate is quoted this week at round 8½d. per lb. for the B.P. grade and 8d. for the commercial. Yellow prussiate of potash meets with a moderate inquiry at 8½d. per lb. There is not a great deal being done in the case of chlorate of potash, but offers in this section keep up at about £35 per ton. Carbonate of potash is selling at about £33 per ton, and caustic at £38. Bichromate of potash is firm on the basis of 5d. per lb. both for contracts and for prompt business, with the former subject to a discount of from 1 to 3½ per cent., according to quantity.

There is a quiet demand about for sulphate of copper, with little or no alteration in the price position to report, to-day's values being at up to £18 per ton, f.o.b. Arsenic meets with a moderate inquiry and prices are steady at £25 to £26 per ton, at the mines, for white powdered, Cornish makes, and £24 10s. for foreign brands. The lead products are steady, with no special feature about the demand during the past week; white and brown acetates are at round £44 and £41 per ton, and nitrate at from £28 10s. to £29. The acetates of lime are in moderate inquiry at £12 10s. per ton for the grey quality and £8 for the brown.

Acids and Tar Products

In the acid section, acetic meets with a quiet demand at steady prices, the commercial 80 per cent. being offered at £39 5s. and the technical glacial at about £52 per ton. Tartaric acid is steady at from 1s. 1¾d. to 1s. 2d. per lb., with citric on offer at round 1s. 2d. There is a moderate demand about for oxalic acid, which is well held at about £2 10s. per ton, ex store.

Company News

American Smelting Co.—A quarterly dividend of 12½ cents per share on the common stock, is payable on February 1.

Anton Jurgen's United (Margarine) Works.—A final dividend of 3 per cent. on all classes of preference shares is announced, payable on and after February 1.

Blundell, Spence and Co.—For the year to October 31 last a profit of £16,602 is reported, against a loss of £3,459 in the previous year. After paying income tax and preference dividend £7,648 is carried forward.

Bemberg Artificial Silk Co.—This company, which is affiliated with Vereinigte Glanzstoff Fabrieken of Elberfeld, reports a loss for the past year of £350,000 (at par), of which £200,000 is covered by reserves.

Fairy Dyes, Ltd.—A dividend of 12½ per cent. is announced, for the year to November 30, on the ordinary shares. The profits for the year including interest and transfer fees, were £22,289, to which is added a balance brought in of £1,930, making £24,219. After payment of dividends there remains £3,089 to be carried forward.

United Premier Oil and Cake Co.—An extraordinary meeting will be held in London on February 17 to consider a scheme of capital reorganisation. It is proposed to reduce the capital from £1,500,000 to £937,500 by cancelling 15s. per share upon each of the 750,000 Ordinary shares of £1 each issued. Upon the reduction taking effect the capital will be restored to £1,500,000 by the creation of 2,250,000 ordinary shares of 5s. each, ranking in all respects pari passu with the 750,000 Ordinary shares at 5s. each resulting from the reduction.

Empire Sugar Industry

Imperial Sugar Cane Research Conference

Important recommendations are made in a review of the cane sugar industry contained in the Empire Marketing Board's Report of the Proceedings of the Imperial Sugar Cane Research Conference held in London in July last. This Conference was convened by the Empire Marketing Board to discuss the future of scientific research on sugar cane production in the Empire. It was felt, however, that the world economic position of sugar should be taken into consideration before drawing up a research programme. In all, twelve recommendations were made, which included the establishment of four central cane breeding and research stations in India, Australia, Mauritius and the West Indies; the extension of research on biological control of insect pests attacking cane; visits to various producing countries by specialists; surveys of the economic position by the Imperial Economic Committee; investigations into methods of cultivation and labour conditions, and a closer study of the utilisation of sugar by-products.

Cane sugar now accounts for about 60 per cent. of the world's supplies of raw sugar, and beet sugar for the remaining 40 per cent. The world production of beet sugar has risen so rapidly that it now amounts to 11,500,000 tons, of which about 400,000 tons is produced in the United Kingdom. The by-products made out of sugar both from the molasses and from "bagasse," (the fibrous residue of the plant after the juice has been extracted) include paper, artificial silk, explosives, charcoal, rum, power alcohol, "dry ice," yeast, fuel and fertiliser. Owing to the low value of the primary product, these by-products are becoming of increasing commercial importance.

Information Services for Industry

The work of the intelligence officer, which is a comparatively new profession to assist industry, was explained in detail by Mr. Arthur F. Ridley, the secretary and librarian to the British Non-Ferrous Metals Research Association in an address given to the University and Research Section of the Library Association, at University College, London, last Saturday. The Non-Ferrous Metals Research Association, he explained, now served a body of some two hundred manufacturing concerns who were associated for the purpose of carrying on co-operative scientific research for the ultimate improvement of products of the British metal industries.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

RAVENOID CELLULOSE PRODUCTS, LTD., Hull, paint, etc., manufacturers. (M., 30/1/32.) Registered January 19. £300 debentures; general charge.

ZINC MANUFACTURING CO., LTD., London, E.C. (M., 30/1/32.) Registered January 13. Charge, to Williams Deacon's Bank, Ltd., securing all moneys due or to become due to the bank; charged on lands and buildings at Kingsnorth (Kent). *——. October 26, 1930.

County Court Judgment

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

MR. G. CLARK, 311 Ewell Road, Surbiton, chemical manufacturer. (C.C., 30/1/32.) £11 15s. 9d. November 16.

London Gazette, &c.

Winding-Up Petition

MAYPOLE MARGARINE WORKS, LTD. (W.U.P., 30/1/32.) A petition for the winding-up of this company by the High Court of Justice was, on January 18, presented by Sir Norman James Watson, Bt., of Sulhamstead House, near Reading, Berks, and W. T. Norton, of 24 Hoodcote Gardens, Winchmore Hill, Middlesex, and is directed to be heard at the Royal Courts of Justice, Strand, London, on February 1.

Receiverships

HAY'S INDUSTRIES, LTD. (formerly Hays Marine Waterproof Glue Co., Ltd. (R., 30/1/32.) A. R. Lapthorn, 70 Commercial Road, Portsmouth, appointed Receiver on January 1, 1932, under powers contained in debenture dated June 17, 1929.

TALLOW OIL PRODUCTS, LTD. (R., 30/1/32.) V. Lenz, 54 King's Road, Brighton, appointed receiver and manager on January 9, 1932, under powers contained in instrument dated April 27, 1931.

New Company Registered

ANGLO EUROPEAN MANUFACTURING COMPANY, LTD., 37 Broadwater Road, N.17. Registered January 21. Nominal capital £1,200 in £1 shares. Chemists, druggists, drysalters, oil and colourmen, manufacturers of and dealers in alcohol, chemical drugs, essences, essential oils, perfumes, soaps, etc. Directors: G. Pickering, H. Kaulvers.

New Chemical Trade Marks

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to February 20, 1932.

APSHAN.

527,954. Class 1.—Paints, and compositions in the nature of paints. Bituminous Compositions Ltd., Victory Works, Railway Street, Grimsby; manufacturers.—December 17, 1931.

GLISINTH.

518,754. Class 1.—Chemical substances used in manufactures. Skuse & Co., Ltd., 7 Lamb's Conduit Street, London, W.C.1; manufacturing chemists.—December 16, 1930.

RUNL.

528,042. Class 2.—Chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Irish Chemicals, Ltd., 17 Garfield Street, Belfast, Northern Ireland; chemical manufacturers.—December 21, 1931.

SARWOP.

528,038. Class 1.—Paint. Western Oxide and Paint Co., Ltd., Beech Avenue, Cattedown, Plymouth; manufacturers.—December 21, 1931.

XYLAMON.

525,991. Class 1.—Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Consolidirte Alkaliwerke (a Joint Stock Company organised under the laws of Germany), Douglashall No. 1, Westeregein, Bezirk Magdeburg, Germany; manufacturers.—September 28, 1931. (By Consent.)

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country) except where otherwise stated.

BELGIUM.—A Brussels firm desires to secure representation of United Kingdom manufacturers of chemicals, pharmaceutical products, etc. (Ref. No. 154.)

BELGIUM.—A commission agent at Brussels desires to secure representation of United Kingdom manufacturers of tanning extracts, leather, etc. (Ref. No. 156.)

SOUTH AFRICA.—A manufacturers' representative in Cape Town desires to secure representation of a United Kingdom firm for glue. (Ref. No. 150.)

Works Refuse in Steam Generation

WORKS refuse generally has a net heating value of 2,000-2,500 B.Th.U. per lb., and will evaporate 1-1½ lb. of water per lb. of material. Complete combustion with full utilisation of the heat can, however, only be given by using forced draught so as to maintain the necessary very high temperature in the furnace. For this purpose a forced draught steam jet furnace is particularly suitable, since it should burn works refuse as easily as high grade coal and coke, sawdust, peat or lignite. The arrangement of hollow trough firebars and a forced blast of air and steam results in an intense "local" heat, almost a blow pipe action, while the bars are not affected because of the cooling and protecting action of the steam. As to whether it is better to use the refuse direct in the boilers equipped with forced draught on these lines, taking not over 3 per cent. of the steam produced, or to have a separate small combined destructor with an independent boiler, depends on the individual conditions.

Dairy Research

THE Empire Marketing Board has issued a report, compiled by Sir William Dampier, on "Dairy Research" (E.M.B. No. 44. H.M. Stationery Office, 1s. net). The subject is dealt with under (1) What is dairy research, and what is the dividing line between a dairy research institute and other research institutions in the sphere of animal nutrition and diseases, and low temperature research? (2) What is being done in this field? and (3) What extensions are desirable, and to what problems should research be directed? A further study of the detection of adulteration by freezing-point methods is recommended. As the consumption of milk per head of population in Great Britain is low, a publicity scheme for milk would, it is suggested, greatly benefit the industry. Attention is directed to some of the important practical results that have emerged from research work, such as the influence of pasteurisation on the vitamins in milk, the keeping and ripening of dairy products, the utilisation of by-products and the inheritance of high milk yield.